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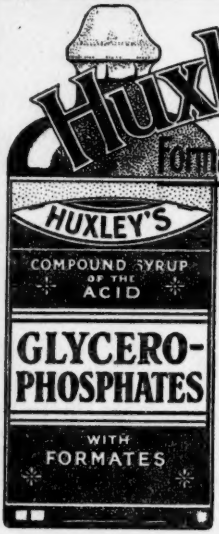

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FIG. 1.

FIG. 2.

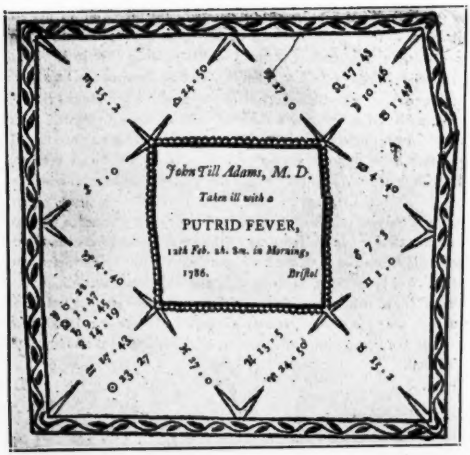

FIG. 3.

In consequence of the increased cost of production, it has been found necessary to raise the price of the "Bristol Medico-Chirurgical Journal." The volume for 1920 will be issued at 10s. 6d. (four numbers) to subscribers. Single numbers will be priced at 3s.

The Bristol Medico-Chirurgical Journal.

" Scire est nescire, nisi id me
Scire alius sciret."

DECEMBER, 1919.

CONTEMPORARY MEDICINE FROM THE STANDPOINT OF PATHOLOGY.

The Presidential Address, delivered on October 8th, 1919, at the opening of the Forty-sixth Session of the Bristol Medico-Chirurgical Society.

BY

I. WALKER HALL, M.D.,

Professor of Pathology, Bristol University.

IT is a pleasant duty to express my appreciation of the honour conferred by you in permitting me to occupy the Presidential Chair of this well-known and highly-esteemed Society. A close association with its work during the last thirteen years has rewarded me with many happy memories. Foremost among these I place the friendships of those former Presidents and Officers whose lamps went out while the war was raging. To Munro Smith, Mole, Michell Clarke, and others we owed much, while the influences they exerted at our meetings will remain with many of us until we too reach the Gates of the West.

Perhaps I may be pardoned if I venture to hope that the selection of a representative of the subject of pathology as your President will not divert your clinical interests unduly. It may be that your action presages a more binding union between the laboratory and the bedside and a more intimate understanding of the objects of each. At all events, I have been led to think that a review of these relations in the light of history, experience and outlook may not be without its interest and stimulus.

Such a consideration of contemporary medicine from the standpoint of pathology enables me at once to revert to a period when each practitioner undertook entirely his own medical work. It permits me to scan the well-known developments of medical sciences, not from the accounts of the great pioneers themselves, but through the spectacles of those men whose practice was influenced by the various discoveries which lessened suffering and prevented disease.

Turning first to the English edition of the *General Practice of Physicke*, by Christopher Wirtzung, published by Thomas Adams, of London, in 1617, we are told (p. 3) :—

" That the reason of man seemeth to complain greatly, that our nature should be subject unto so many infirmities, miseries and calamities ; Yea, it doth as it were, chide with God, and accuse him of tyranny, for creating man so wretched. And, in very deed, a worldly minded man, that neither acknowledgeth God, nor the *cause* of his natural imperfections, might easily be brought and carried away with such like opinions, and with great reason bewail the infinite wretchedness of mankind, seeing he findeth no creature on the face of the whole earth that is vexed with so many infirmities, but man only : But contrariwise, they that are endued with the knowledge of God and godliness, will not accuse him of tyranny that is most gentle ; will not accuse him of evil,

that hath created and made all things most perfect and good, nay, that never could nor would do harm. Adam was created in the beginning, sound and whole, perfect, wise, absolute and without blemish or spot whatever: but by disobedience, transgressing the commandment of God, in that he would, without contradiction, be made like unto God, and know both good and evil, which he did of his own stubborn head, and in despite and contempt of his Creator: herewith hath he not only brought and wrought unto himself, but unto all his posterity after him, an everlasting mishap and infelicity, as a well worthy and deserved punishment for his and our misdeeds together. Wherefore sin is the first and only cause of all our distress, of all our sicknesses and heaviness here on earth: which has brought us to that state, that after all our turmoiling and painstaking, we must at the last taste and take death as a merit and payment for our sins."

It was not to be expected that this finality of causation would gain prolonged acceptance in a period when philosophers generally were pushing back the causal factors of existence by argument and experiment, and Bacon was, at the moment, illuminating thought with his methods of analysis.

Hence, we are not surprised to find that thirty years after the death of Bacon, Riverius in his book on *General Medicine*, published by Henry Everden at the Greyhound in St. Paul's Churchyard in 1657, tells us (p. 116):—

"A physician ought always in the legitimate and rational cure of preternatural affections, to observe this method: First, he must act the industrious scrutinist, in enquiring after the nature and causes of the proposed disease and the situation of the part affected. Secondly, he must make a diligent search, whether the cause be not desperate and the disease incurable: that hence we may gather, that remedies

fit for the acquisition of health are to be applied, if our Art upon serious inspection promise a recovery: or if the prevalent disease delude our skill to a despair: forthwith to abstain from administering anything, lest those applications which have procured health to any, should be undervalued to a dis-esteem."

This recognition that the old Adam is not the only cause of disease is a belated tribute to the influence of Bacon and other philosophers; but it is a quaint mind which would preserve faith in tried remedies by reserving them for cases with a good prognosis.

It reminds one of Thomas Carlyle, who once remarked that "had Adam remained in Paradise, there had been no anatomy and no metaphysics," and went on to contend that "the beginning of enquiry is disease; all science, if we consider well, must have originated in the feeling of something being wrong." "Thus," continued the old satirist, "the Tree of Knowledge springs from a root of evil, and bears fruits of good and evil." [1]

Riverius defines disease as "a disposition of a body preternatural, primarily and by itself injuring the actions." "If we deliberate of action itself," he goes on to say, "if it be hurt in man's body, we say it is sick; but if whole and unhurt, we say it is in health. I call that action hurt, which manifestly and sensibly appeareth such. Moreover, action being a motion, and having no permanent essence, only so long in being as it is doing and performing; therefore it implies the necessity of a constant and permanent cause. If therefore the body be in health, when being naturally disposed, it produceth perfect actions; it will be diseased, when it being disposed beside nature, it exerts actions imperfect, and so this detriment of actions will depend upon this preternatural disposition."

There is much in this that accords with current ideas

upon re-action to irritants; it seems as if the same fundamental question agitated human minds century after century.

Riverius considers in detail the nature of morbid causes, and concludes that in disease the efficient is the only effective one.

"The philosopher rallies all the causes of things under four heads, viz., Formal, Material, Efficient and Final." The efficient is the only considerable one. It is not only that from which the effect is first produced, but stands for all that which is in any manner conducible to the generation of the disease.

The critical days of a disease form a subject which looms large in the mind of our author. He defines crisis as a "kind of compound, comprehending conturbation, evacuation and sudden mutation to health." Conturbation is a plenty of critical symptoms arising from the agitation of morbid matter. The principal cause of this agitation is the motion of the moon, which moves the humors every critical day and excites nature to evacuation. But there must be other causes of an internal nature, for nature does not attempt exertion, unless she finds matter prepared and disposed for evacuation. Still, the crisis, or critical evacuation, which happens in the septenary or quatenary days, is due to the virtue of the moon.

Were I to detail the many subsidiary causes which Riverius marshals with striking confidence, it would be evident to you that he is trying to break away from old traditions even while he feels himself shackled by current thought. But before I examine the persistence of supernatural influences, you will perhaps permit me to refer to a few rhymes which Riverius ascribes to the Salerno School that was so dominant from 1300 to 1500 A.D. It is very curious how odd phrases and rhymes have crystallised certain

ideas, which otherwise would have had their day and ceased to be :—

> " At supper if you fill with meat
> Your stomach, your pain will be great ;
> If you desire a quiet night,
> Make a supper short and light."
>
> " After supper stand a while,
> Or else walk a mile."
>
> " Beware how thou eatest crust,
> For it produces choler adust."
>
> " Beets nourish little, I must tell ye,
> They do both bind and loose the belly."
>
> " Of cabbage this for certain we do find
> The broth doth loosen, but the substance bind."

And now we come to a period when from our charming Wrington village John Locke went on to Oxford to apply his genius to medical research and to gain such high approbation from Sydenham ; when Sir Thomas Browne foresaw the growth of tropical medicine, writing in one of his letters, " New discoveries of the earth discover new diseases ; for besides the common swarm, there are endemial and local infirmities proper unto certain regions which in the whole earth make no small number ; and if Asia, Africa and America should bring in their list, Pandora's box would swell and there must be a strange pathology " ;[8] and when Morgagni was in the hey-day of his startling work on morbid changes. What was the effect of all this on contemporary medicine ?

I turn to a volume entitled a *Key to Physic and the Occult Sciences*, published some twenty-seven years after the death of Morgagni, by E. Sibley, as a supplement to his edition of Culpeper's *English Physician*.

His frontispiece (Fig. 1) is a strange mixture of alchemy, geometry, astronomy and mysticism. Those acquainted

with the symbolism of secret societies will see much in it of interest. He dismisses the purely pathological aspect of man in the following words: "*Memento mori!* The life of man resembles a bubble ready to burst; his fate is suspended by a hair, and is dependent upon the uncertain lapse of time." "Life," he considers, "begins in motion and ends in rest." Disease is a "perturbation in the progressions of motion," a new phrase for action hurt.

He upholds strongly the doctrine of expulsive force, or evacuation of foul and offending humors from the blood by means of insensible perspiration and provides a special plate for its demonstration (Fig. 2), remarking that "it passes through our garments with the utmost ease, particularly, if woollen; and it even ascends through the bedclothes like a mist, in the greatest abundance when we are asleep, and the animal functions are at rest."

But his main thesis is the action of the sun and planets upon the internal organs. His predominant idea is prognosis with celestial influences as his guide. He gives a tangible instance in the decumbiture of Dr. John Till Adams, of Bristol (Fig. 3). This Adams, according to Munro Smith, assisted Borlase in his difficulties with the Infirmary staff. He practised chiefly among Quakers, and his death opened the way for the coming of Long Fox. Sibley himself also worked in Bristol, for he states: "These figures I erected while resident in Bristol, at the request of my good friend, Dr. Till Adams." From an exposition of the decumbiture he derived the factors which "put an end to the existence of this much respected man. Eight days after he was seized by a fever and six days after it was foretold by the horoscope; from whence, having foreseen the doctor's fate, I composed an Elegy on his death, while he was yet alive, which I got printed and published the very day he expired, thus manifesting to the world, with the patient's earnest approbation,

an incontrovertible instance of the verity of astral prediction."

A similarly accurate forecast was made concerning the French Revolution and the violent deaths of the King and Queen six years before they occurred.

Yet this good man, confident in his beliefs, relied much upon a certain solar tincture be obtained by re-distillation of vegetable residues, and includes in his work the following letter :—

To E. SIBLEY, M.D.

SIR,

In gratitude, I cannot but thank you for that excellent medicine, the solar tincture. It has saved my life. I was suddenly seized with a violent cholic, which brought on mortification of the bowels. The efforts of the Faculty were tried in vain, and I was given over. In these moments of extremity, my existence was preserved by only two spoonfuls of your medicine, undiluted, which instantly relieved me from the wrack of torture. After two more doses, the obstruction was removed by natural evacuation, and a few hours restored me to my usual state of good health. I entreat you to publish this for the public good and shall be ever,

Gratefully yours,

JOHN POWELL.

CLIFTON, NEAR BRISTOL,
Feb. 24, 1794.

It is worthy of mention that four years before Sibley issued his treatise, the notebook of a nameless medical student contained a record of the post-mortem findings upon a wet nurse, E. C., who died at the Bristol Royal Infirmary on March 7th, 1794. The report is carefully transcribed and the pulmonary morbid changes are clearly stated ;

while it indicates that teaching in pathological anatomy was already a feature of the day.

This was an observant student, for his notes include the following :—

" It has been disputed whether the menstrual blood comes from the vagina or the uterus. A case lately occurred where there was so great a prolapsus uteri that the Os Tincæ hung a considerable way below the labia pudendi, and at the time of Menstruation the Blood was found to ooze out from the internal part of the Os Tincæ, which proves that the Blood comes from the uterus."

Some forty years later Richard Smith gave an address at the opening of the Bristol Medical School at Old Park (October 14th, 1834), in which he summarised clearly the attitude of current medical thought towards scientific developments. He said : " The origin and nature of those changes of composition and texture to which every organ is liable and which form the prelude to those changes of structure, first affecting functions and then altogether destroying them, are the subjects comprehended by morbid anatomy. This substitutes demonstration for theory and conjecture, and lays the solid foundation for rational practice. By the study of morbid anatomy the student will soon lose the feelings of disgust at the sight of diseases even the most hideous. His feeling is changed for one of a more abstract character ; he sees in the case only peculiar conditions of the cellular tissues ; increased action of the absorbents ; increased vascularity ; turgescence of the veins or vitiated secretions of the capillaries."

This bespeaks a breadth of vision hardly expected eight years before Schwann outlined his cellular theory of the organism and fourteen years before Virchow stated his views upon cellular pathology. Had it become more general among the clinicians, the limitations of morbid anatomy

would have been recognised at an earlier date, and the end stages of disease would have less often formed the mental picture which the student carried to the bedside during the early days of an illness. But the gross structural changes held the attention for long; the abstract visualisation was a capacity as rarely apparent as it is hard to stimulate to-day.

The examination of the morbid changes in tissues demanded more time, however, than the clinician could bestow. The pathologist was born. For long he was the servitor of the physicians and surgeons. Perhaps in making him the Cinderella of the art the elder sisters forgot the ending of the story.

So, for forty years more medicine clung to the *Sectio* and the sections. Men had forgotten that striking experiment of Bacon which practically caused his death. How the old man was driving in his carriage on a snowy day, when he conceived the idea that cold might prevent putrefaction. He stopped at a cottage, procured a fowl, had it killed, stuffed it with snow and confirmed his thought. The clinician of the period seemed also to be unaware of the fundamental and exhaustive work of Bossi—published but twelve months after Richard Smith had given his address—which laid the foundation of subsequent bacteriological developments. Until Pasteur and Koch in 1877 startled the medical world by the applications of Bossi's technics, contemporary medicine had lagged behind. Much of their work is but now filtering slowly into general practice, although pathology has since then extended new branches of morbid physiology, hæmatology, protozoology, pathological chemistry, serology, immunology, etc.

What is the position of contemporary medicine to-day in its relation to current pathology? The text books are numerous. In all, or nearly all, the contained pathology

is the current teaching of the hour. If the seventeenth and eighteenth centuries required fifty years for the incorporation of new conceptions and the late nineteenth called for a decade, the twentieth century presents its clinicians with yearly or half-yearly editions brought up to date of publication. But pathology, in common with other subjects, has developed its own terminology ; in my haste, I had almost written its own Babel. Hence, although the matter is up to date, its intelligent appreciation is precluded until the reader is *au fait* with the occult. The epopt is excluded from the elect.

So it is that although we derive our status from a faithful stewardship of the " knowledge which has been garnered for us by an illustrious brotherhood of men—many of whom paid for it by their lives," we are split up into sections, perhaps factions, which tend to preclude any broad conceptions of our trust. Our views are narrowed, our outlook is limited by the very depth of the ruts we have made. We have gone too far apart in our pursuit of the sectional. While we may follow Sir William Gull in his claim that " from the ranks of our profession the chief cultivators of modern science have sprung ; whether we speak of botany, comparative anatomy, chemistry, physiology, biology, hygiene, or social science," we are tempted to forget the converse, namely, that the common ground of these outgrowths is human life, its experience and its possibilities. This fundament may ever be to us an incentive to use all means of intercourse to bring the subdivisions of medical science into correlation. The future calls for a closer link between investigation and practice. The entrusting of the teaching of anatomy, physiology, pathology and special subjects to experts is of benefit only so long as the specialist retains his sense of clinical requirements. The delicacy of this sense depends naturally upon the opportunities for renewal and stimulation ; so that

the maintenance of true medical insight calls for a continuous association between the laboratory and the bedside.

Contemporary medicine, on the other hand, may gain much by a more intimate association with the workers in special subjects. "The pathologist," says Gull, "follows the steps of the physiologist, and often their work is but one." Again, "Where hygiene fails, properly commences the work of therapeutics; but it is painful to find ourselves occupied in making feeble, and often useless, efforts to combat the effect of a poison which might perhaps have been stamped out in its beginnings."

Were I a clinician—was that a whisper, "The gods forefend"?—I would not rest content until the staffs of hospitals included anatomists, physiologists, bio-chemists, as well as pathologists, until I could meet them in daily consultation and co-operation in my wards. And I would strain my interest to bring them into working association in out-patient departments, dispensaries, urban and rural clinics. I would urge that in the building of these institutions there should be suites of rooms radiating outwards from a central nucleus of scientific laboratories. A pathologist should be my colleague in the examination of all new, and apparently trivial, cases. With him I would undertake all possible, and seemingly impossible, examinations upon patients exhibiting the beginnings of dyspepsia, headache, catarrhs, amenorrhœa, sexual mentalities, and anomalies of metabolism. The anatomist and physiologist should be my mentors in the slighter ailments of childhood, and of puberty, etc. On certain days the practitioners should join me and enlighten my staff with their experiences, inquiries, and difficulties. The industrial hygienist should have his place also, and bring for observation and discovery the early symptoms of altered function or lowered resistance.

I am convinced fully that in such a working co-operation

there would be great economies in time and material, while the general results would comprise a more rapid advance in the prevention of disease. I dare to assert that a decade of such conjoined medical effort would bring immeasurable advantage to the health of the community and the maintenance of our industrial units. I cannot visualise any sounder investment, or one presenting greater possibilities of capital appreciation, than that which is wisely directed towards the control of the early stages of disease.

My feelings of gratitude for what Bristol has already done, and my personal obligations to you as a Society, are intensified when I remember that Locke wrote—

> " Nothing in this world is single.
> All things by a law divine
> In another's being mingle."

While I learn anew the lesson of humility, as Kingsley sings to me—

> " Each has his gift—
> Our souls are organ pipes of diverse stop
> And various pitch ; each with its proper notes
> Thrilling beneath the self same breath of God,
> Though poor alone, yet joined, they 're harmony."

REFERENCES.

[1] *Characteristics.* 1831. Thomas Carlyle.
[2] *Letter to a Friend.* Sir Thomas Browne
} Quoted by E. Blyth. *Ways of Healing.* Heffer, Cambridge, 1919.

DISEASE IN MESOPOTAMIA.

BY

Major F. P. MACKIE, M.D., M.Sc., F.R.C.S., F.R.C.P., I.M.S.

IN thanking the Society for the privilege of speaking on some of my experiences in Mesopotamia, I must apologise for the absence of figures and statistics from this paper. As all my records were left in Baghdad, I cannot trust my memory to supply accurate figures.

I left France for Mesopotamia at the end of 1915, and remained there till February, 1919. Until the spring of 1918 I was in Amara, in command of the Central Laboratory and Consulting Bacteriologist to the area. I was afterwards transferred to the newly-opened Central Laboratory in Baghdad, a much more ambitious affair, and there I remained nearly a year. The staff of this laboratory consisted of myself as O.C., an assistant bacteriologist, an analytical chemist, a protozoologist, an entomologist and a special malarial officer; whilst the laboratories of the Water Examination Unit with four chemists and the Veterinary Pathological Laboratories were housed under the same roof, and affiliated to the Central Laboratory. A mobile laboratory was formed, and stood ready with staff and equipment to start at a few hours' notice to investigate any outbreak of disease and to advise the local authorities on measures of prevention and cure. Of all pathological organisations in Mesopotamia the mobile laboratory was probably the most useful, and its work was certainly the most interesting.

I will now pass on to consider the chief points of interest about some of the principal diseases.

Enteric Fever.—This disease was prevalent throughout the campaign, and during 1916 especially it was one of the principal causes of severe illness and death.

B. Typhosus infections were much less common than those of *Paratyphoid A*. The figures from a total of 660 blood cultures in 1916 were 20 per cent. and 80 per cent. respectively. *Paratyphoid B.* was at this time excessively rare ; only twice was it recovered at the Central Laboratory, Amara, during the year. In following years the number of cases of *Enterica* were less, and the relative proportions of *B. Typhosus* and *B. Paratyphoid B.* increased as compared with *Paratyphoid A*. It was the practice to take blood cultures in all cases of fever lasting over four days (in which malarial parasites were not found), and up to the fourteenth day. Subsequent to that three different samples of the fæces and urine were examined. Clearing tests were also done on soldiers who were convalescent from enteric fever, and they were afterwards sent to India to carrier depots, where final clearing tests were done. This system of taking blood and stool cultures worked very well, and it is probable that few cases of enteric fever escaped undetected.

In the early days we attempted agglutination tests in those cases too late in the disease for blood culture ; but later on, when T.A.B. vaccination supplanted plain *typhosus* inoculation, this test was given up as unreliable, and eventually an order was circulated forbidding the diagnosis of these diseases by agglutination only. It is certain that no reliable conclusion can be come to by a single agglutination in an inoculated person, though it is possible to do so if a number of examinations are made at different periods throughout the disease and a curve of the reaction to all three organisms plotted and studied by an experienced

observer. Professor Dreyer's method is very valuable in performing these quantitative tests.

During 1918 a strange paratyphoid organism appeared, which had probably come down from Western Persia and the region of the Caspian. This organism was recovered by blood culture from some twenty or thirty patients, and was first returned as an inagglutinable form of *Paratyphoid B.* It gave the sugar and morphological reactions of that organism, but failed to agglutinate with standard *Paratyphoid B.* high titre sera. Some strains, it is true, gave a modified or incomplete reaction with this serum, but most strains were not agglutinated by it at all. It was agglutinated in very high dilution by its own sera made by inoculating a rabbit, and a number of absorption and cross-agglutination tests showed it to be a specific organism and not merely a variant of *B. Paratyphoid B.* On these grounds we felt justified in taking the paratyphoids farther down the alphabet, and called it *B. Paratyphoid C.* It had previously been found at Erzingen in Turkey-in-Asia, and was there regarded as either *B. Aertrycke* or *B. Suipestifer*, but our investigations in Baghdad showed it to be different from both these organisms. From a clinical point of view it was interesting on account of its tendency to produce visceral complications, particularly pneumonia. It was recovered in a number of cases from the lungs in typhoid-pneumonia and also from other organs, also from abscesses following typhoid, and in one case from necrotic areas in the liver in an obscure typhoid-like disease. The occurrence of this organism has since been reported from other parts of the world.

Further details as to this organism can be found in a paper by myself and Captain Bowen, R.A.M.C., and another by Captain McAdam, R.A.M.C., in the *R.A.M.C. Journal* of August of this year.

Dysentery.—Both types of the disease were common, the amœbic type all the year round and the bacillary chiefly in the spring and autumn in epidemic form. An enormous amount of work in fæcal protozoology was done in my laboratory in Amara by Captain Lapage, R.A.M.C., but the subject is too involved and too controversial for me to say anything about it here. If an amœba was very active and contained red-blood cells, or if the fæces contained cysts with four or less than four nuclei, the evidence was accepted as being that of *E. Histolytica* and the disease being amœbic dysentery. Amœbæ and cysts not answering to this description were not returned as those of *E. Histolytica*. I am sceptical about most of the cases of flagellate dysentery. The only case in which I saw sufficiently large numbers of lamblia flagellates to justify a diagnosis of lamblia diarrhœa was proved on culture to be one of mild Asiatic cholera. *Balantidum Coli* undoubtedly produces diarrhœa, but it was very rarely found in Mesopotamia.

Amœbic abscess of the liver was frequently met with, and in many of the cases it quickly followed the disease in the bowel.

No attempt was made to isolate cyst carriers, as it was found that over 10 per cent. of apparently healthy soldiers carried histolytica cysts.

Bacillary dysentery was a much more formidable cause of invaliding and death. It showed a seasonal rise in the spring and autumn, especially the latter, and on several occasions it caused localised epidemics of great severity. There was a large refugee camp near Baghdad where some 30,000 refugees from the north-west parts of Persia and the region about Lake Van congregated. They marched down to escape the terrors of rapine, murder and starvation at the hands of the Turks, and those who did not die on the road were put in a large concentration camp. Dysentery made terrible havoc

amongst these debilitated, half-starved women and children and many died.

The mobile section at the Baghdad Central Laboratory was sent up in charge of my assistant, Captain Bowen, and a collection of large intestines was sent down to us showing an almost unbelievable state of inflammation, ulceration, necrosis and sloughing. The large majority of these cases was due to *Shiga* infections, and often direct culture from the stools on MacConkey plates showed pure cultures of *Shiga* bacillus.

Just after the Armistice I took the mobile laboratory to Mosul to inquire into an undue prevalence of dysentery and diarrhœa. I found a variety of causes at work. One was the presence of saline aperient matter in the water, another the irritating quality of the flour taken over from the Turks; and another factor was the enormous number of flies and the fouling of all articles of food by them. Histolytica cysts were found in the alimentary canal of some flies and similar cysts on articles of food exposed in the bazaar.

Cholera.—There were several outbreaks of cholera, with only one of which, that at Amara in 1916, was I brought into close contact. This outbreak occurred in two British hospitals about the same time and resulted in a good many deaths. It was afterwards traced to contamination of milk brought in from Arab encampments, which had somehow escaped sterilisation at the hospitals. There was an epidemic in 1917 in Baghdad, of whom the most lamented victim was that great General, Sir Stanley Maude.

Malaria.—Mesopotamia as a whole is not badly infected with malaria. The rain comes in the cold weather, and by the time the temperature is high enough for the cycle to take place in the mosquito the water has dried up. This does not apply to Bursa or Kurna in the south, where

flooding takes place from the swollen rivers in March and April. In the creeks and irrigation channels around the date palms *anopheles* breed in enormous numbers and malaria is prevalent.

When our troops were marching through Persia up to the Caspian they encountered very different conditions, and malaria became a perfect scourge.

In the summer of 1918 a series of cases of a malignant kind of jaundice occurred in some of the camps on the Persian lines of communication. Several British soldiers died, and others were invalided. I was sent up with my mobile laboratory in company with Colonel Willcox, the Consulting Physician to the Force, to investigate the disease, which was reported to be probably spirochætal jaundice. We found the disease to be a very severe form of malignant tertian malaria with jaundice, and this was verified by microscopic examination. Most of the cases were swarming with malignant tertian parasites, and several were infected with two or even three species of parasite. I was able to clinch the matter by finding anopheles in the tents, by finding their breeding-places near the camp, and finally by dissection of 100 consecutive insects found a *zygote* stomach infection in one and a sporozoit infection of the salivary glands in another. The local and only species of anopheles, *A. Nursei*, was thus added to the list of proved malarial carriers.

On another occasion I went with Major Christophers, the well-known malariologist, right up to the foot-hills of Persia opposite to Lake Van, some 300 miles north-east of Baghdad. There, amongst the most exquisite natural surroundings, we found a population more stricken with malaria than we had seen in the worst parts of India or Africa. Practically every child was diseased, and the results of profound anæmia and malnutrition were evident everywhere. We went up to

choose a health resort for Baghdad, but we returned sadder and wiser men.

Typhus and Relapsing Fevers were met with during the cold weather, and were particularly virulent amongst the refugees who came down from Persia. There was no very marked epidemic of either disease amongst British or Indian soldiers, but labour corps and the civil population seemed to suffer more.

An epidemic occurred amongst the Turkish prisoners in the Busra concentration camp early in 1916, and the heavy mortality was attributed to malaria. I was sent down from Amara to investigate it. The epidemic was subsiding when I arrived, but there was enough evidence to show that the epidemic was a mixed one of typhus and relapsing fever—diseases of an identical epidemiology, being both louse-borne. The typhus and relapsing fever infections were brought down from Upper Mesopotamia by the Turks themselves. Relapsing fever in Busra at that time came from three distinct sources: one, the severest, was brought down by the Turkish prisoners; a second, much more mild, was brought in by a British regiment just arrived from Port Said; the third was an indigenous infection amongst the civil population in Busra bazaar.

The mortality amongst the Turkish prisoners had a political if not international importance, and the Government of India were very relieved to find, as my report showed, that the infection had been brought down by the prisoners themselves, and had not been contracted through any negligence on our part.

Trench Fever.—Another louse-borne disease, *Trench Fever*, was not noted in Mesopotamia. It is true that a distinguished member of this Society recorded his own case as probably one of trench fever. If it was so, it was the

only case met with as far as I know in the campaign, though physicians were constantly on the look-out for it.

Jaundice.—There was on occasions a great prevalence of a simple catarrhal jaundice, such as was met with in the Dardanelles and on the Indian frontier, and which is called "camp jaundice." A very full and excellent account of these and other forms of jaundice will be found in the Lettsomian Lectures of this year by the Consulting Physician to the M.E. Forces, Colonel W. H. Willcox, C.B., C.M.G., A.M.S., in the *British Medical Journal* for May 10th, 1918, *et seq.* He deals fully with the types of jaundice noted in Mesopotamia, and briefly with the results of our investigations. Sufficient to say here that no infective agent was found in this camp jaundice, either by fæcal examination, blood examination, liver puncture, gall-bladder puncture, or by the removal of duodenal contents by Einhorn's sound. I employed all these measures without recovering any unusual organism.

The spirochætal type of jaundice was not found, though I carefully investigated five or six cases of jaundice of the acute yellow atrophy type, both before and after death, by dark ground illumination and by guinea-pig experiment, but never found a spirochæte. This fatal type of jaundice resembled those due to poisoning by tetra-chlor-ethane and other such drugs, and like those occasionally met with after salvarsan injections.

Diphtheria.—Bacteriological diphtheria was common, but clinical diphtheria very rare.

In one regiment I examined which had recently come from India about 30 per cent., I think, showed morphologically typical Klebs-Löeffler bacilli. They appeared to be non-toxic to the men, and were generally so to guinea-pigs. The organism persisted a very long time in the throat in

spite of the most vigorous local treatment. In the case of one officer I remember he was kept in quarantine for 85 days, and his throat yielded an almost pure culture of diphtheria on every examination, but he never showed a symptom. This is the sort of case that causeth the enemies of bacteriology to blaspheme. Latterly we came to disregard diphtheria bacilli except under special circumstances.

Heatstroke.—Time does not permit me to say much about this disease, though there is much I might say. It claimed many victims, especially during 1916 and 1917, and I remember seeing 26 men admitted at once from one camp on a certain afternoon in July, 1916. They were all lying in rows in the entrance hall of one of the hospitals, whilst "bhistis" poured water over them.

It seemed that a man could resist very high temperatures as long as he remained in health; but if his temperature rose from whatever cause, such as sand-fly fever, malaria or paratyphoid, his heat-regulating centre seemed to "lose its head," and his temperature would soar up to 109° or 110° F.

I saw Sir Victor Horsley a great deal when he was out there. He often used to come into my laboratory and sit and talk over our work, and I had the sad duty of examining him in his last rapid illness and of seeing him to the end. He died of heatstroke, which developed rapidly, and he was unconscious the greater part of his illness, which only lasted about thirty hours.

In the investigation of heatstroke we used an instrument called the Kata thermometer, which I believe was introduced by Professor Leonard Hill, and found it very valuable in giving an indication as to the atmospheric conditions likely to be followed by heatstroke. It registers the rate of evaporation from a moist surface such as the human skin, and gives information which is not supplied either by the dry or wet bulb of an ordinary thermometer.

Sand-fly Fever.—This troublesome disease caused a great deal of inefficiency, especially during the hot weather and in standing camps. The fever only lasts three or four days, but those affected are left slack and depressed for a week or ten days afterwards, and some suffered from cardiac irritability or irregularity which interfered with a speedy return to active duties. It was especially prevalent in the standing camps at Busra, and almost everyone who passed through these camps during the height of the season fell a victim to this annoying complaint. Sand-flies were very numerous, and the only way to ensure protection was by the use of a very fine-meshed mosquito net, which many found almost unbearable by reason of its interference with ventilation at a time when the hot weather was at its worst. The causal organism of sand-fly fever has not been discovered, though it has been shown to exist in the blood of infected persons. It is almost certain that one or more species of sand-fly (*Phlebotomus*) is responsible for its transmission.

Plague appeared in epidemic form in all the three big towns, and the Central Laboratories at Busra, Amara, and Baghdad were responsible for the examination of all the rats trapped or found dead in the bazaars as well as for the diagnosis of human cases. As is usual, the rat epizootic preceded the human epidemic by a week or more, and thus some warning was given of the approaching human outbreak.

At one period in Amara in 1917 nearly half the rats found dead in the bazaar were found to be plague infected. Some weeks before the epizootic began on this occasion I received a mass of inflamed intestines and abdominal glands and pancreas which had been removed post-mortem from the body of a British soldier who had died from what was believed to be acute hemorrhagic pancreatitis. An operation for his relief had been performed, but had had to be

abandoned on account of the condition found and because the man nearly died on the table.

I suspected at the time that the condition might be due to that rare disease primary abdominal plague, and was able to prove this by the isolation of *B. Pestis* from the lymph glands, which with the surrounding organs were in a state of the acutest hemorrhagic inflammation. A few days later another sporadic case was recognised by puncture of superficial femoral glands. It is an interesting epidemiological fact that such sporadic cases not infrequently precede the general outbreak, though of course they are often missed.

Oriental Sore.—This disease is extremely common in Baghdad, where almost every child in the bazaar shows a sore or the evidence of old infection. It was very common amongst both British and Indian soldiers. The better class Baghdadis artificially infect their children in some inconspicuous part of the body, and so avoid attacks on the face and subsequent disfigurement and scarring. Though the sores are often multiple when infected about the same time, one attack appears to confer immunity for the rest of life.

It is probable that this disease also is transmitted by sand-flies, but this has not been proved. When working in Assam on the relation of these flies to Kala-azar I found a proportion of the female flies were infected with an Herpetomonas parasite which is closely related to the genus *Leishmania*. It is interesting to note that sand-flies feed freely on the common wall lizard (ghecko), and these lizards are also infected with an Herpetomonas-Leishmanialike parasite. It has been suggested that Oriental sore, the sand-fly and the lizard stand in close relation the one to the other, but no opportunity presented itself of following out this idea, though there was plenty of all three of the factors in the houses of Baghdad.

Some discussion has recently taken place as to whether **Kala-azar** was contracted in Mesopotamia in those patients who developed it there. I had personal experience of most of the cases under discussion, and I take the view expressed by others that the evidence available is not sufficient to prove that in any of the cases the disease was actually contracted in Mesopotamia.

Scurvy was fairly common amongst Indian troops during 1916, when the operations for the relief of Kut held large numbers in an arid wilderness where fresh vegetables could not be obtained, and was particularly marked amongst non-meateaters. Those whose caste principles allowed them to eat meat (as well as British soldiers) did not suffer to the same extent. The disease showed itself chiefly in falling out of the teeth, swelling and ulceration of the gums, and extensive hemorrhages following trivial injuries or even spontaneously, especially in the legs. Some developed hemorrhagic joint effusions, whilst surgeons found that their operation wounds healed badly, broke down and suppurated frequently under circumstances where asepsis would ordinarily have rendered these conditions unknown.

Beri-beri.—This deficiency disease was met with from time to time both in British and Indian troops, and more frequently amongst the Chinese Labour Corps working at Busra. These latter men would only eat the highly-polished rice which had been completely deprived of the pericarp and germinal layers, and would not eat the locally-milled rice, which was coarse but contained the necessary vitamines. I think the difficulty was got over by giving them a more varied ration and by the issue of Marmite, which is a product of yeast and contains accessory food factors.

I did not see much of beri-beri from the laboratory point of view, though I remember an enthusiastic young medical

officer rousing my interest in the matter by sending me a specimen with the following request, "Herewith specimen of fæces from a patient suspected of beri-beri for favour of examination for vitamines."

Before I close I wish to make a few remarks on the relationship of pathology to medicine which my experience in the investigation of disease in India has taught me, and which the late war has only served to confirm and emphasise.

I think our experiences during the war have taught us what advantages there are in the close co-operation between clinicians and pathologists, and I should like to see this principle extended still more into civil life.

The clinician will readily admit the great advantages of an early and exact diagnosis of the cases under his care, whilst the most cloistered pathologist must have felt the vitalising influence which close contact with the living patient must bring. Both will have learned that the sciences of pathology and medicine are not distinct, but are merely different aspects of one great problem—the prevention and cure of disease.

This co-operation has been to me something of an ideal, and one which I have tried to follow all my service; and I should like to tell you, in this Society, from whom I first learnt the principle, and who in my opinion was one of its best exponents. It was my revered friend and teacher the late John Michell Clarke. He constantly taught the value of pathology at the bedside, and the advantages of bringing a vivid clinical experience to the laboratory and the post-mortem room.

I think it would be an advantage if pathologists visited the wards more, and so added their experience to that of the physician, to the greater advantage of the patient.

Again, the clinician might come more often to the laboratory, and there learn the results and the limitations of the various tests; and he might at the same time take the pathologist more into his confidence by describing his cases, and by supplying charts and other documents to help him in his decisions. I think, too, that pathologists should be called in to investigate and advise in cases of dangerous or obscure diseases in private as well as in hospital practice.

The feeblest and least valuable of all forms of laboratory work is what one may call "long-range pathology." Here specimens, often badly collected, are sent a distance with a minimum of information. In such cases the laboratory is treated as a penny-in-the-slot machine, and little good can be expected from the result.

The routine work of a clinical laboratory is not, however, the most important or the most interesting that a pathologist has to do; his greatest work is to discover the beginnings of disease, and to study the underlying processes of which the clinical symptoms are only a reflection.

It is through pathology that the greatest advances in medicine have been gained in recent years, whilst the sanitarian looks to its decision before he can make any real advance in Public Health.

All eyes are turned to the prevention of disease, and to the day when the best brains in the profession will be freed from the task of trying to cure individuals of those diseases which it is the aim of preventive medicine to prevent.

ON THE TREATMENT OF UNUNITED FRACTURES, WITH ESPECIAL REFERENCE TO THE USE OF BONE GRAFTS.

BY

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Introductory.—The delayed union of fractures or their actual non-union is a comparatively rare occurrence in civil practice, but the treatment of such conditions is a matter of very great importance, because it involves the restoration of a limb to usefulness instead of leaving it a crippled encumbrance. Recent military experience has afforded a great field for the study of these questions, and from it we may derive much that will be of lasting benefit to surgery. It is true that in gunshot fractures many special features of difficulty exist, but these too have their lessons for civil practice, and these lessons have been taught with such emphasis that they cannot be forgotten.

Nearly all gunshot fractures presenting non-union at a late stage in their course have been the seat of profound and chronic sepsis; often there has been extensive loss of bone substance, and the bone ends always present a marked degree of atrophy or sclerosis.

About the first two points it is not necessary to say more than to emphasise the fact that septic tissues require a long time for auto-sterilisation, and that whenever non-union of a bone follows a septic wound a very long period must elapse after external healing has taken place before it is safe to attempt reconstructive operations. Three months represents

the minimum period, and then if any ambitious operation is to be undertaken it is wise to replace cutaneous scars by skin flaps or skin grafts, to excise the deep scar tissue, including the ends of the bone, and to postpone reconstruction until smooth aseptic healing has taken place. In difficult cases this will frequently involve the delay of a year or more, during which time the nutrition of the muscles and the mobility of tendons and joints should be maintained as far as possible by massage and exercises.

The third point, viz. the atrophy or sclerosis of the bone ends is one of the most profound importance, and one which is intimately related to the nature and treatment of ununited fractures of all kinds. A bone which has failed to unite, whether because of loss of substance or because of interposition of soft parts, invariably undergoes structural changes. There may be a mere atrophy, with increase of the fatty marrow and an absorption of bone salts, or the bone ends may become thickened and eburnated. But in both cases there is a loss of vascularity and a disappearance of active bone-forming elements. In other words, vitality in the sense of capacity for nutrition and growth is greatly diminished. The importance of these facts is evident in considering the problem of treatment. Devitalised tissue cannot carry out repair, and therefore should be removed until a zone of healthy tissue is reached. To be content with "refreshing" half-dead tissues and then fixing them together is merely courting failure.

The Limitations of Non-operative Measures.—The various well-known methods of non-operative treatment, such as percussion, deep massage, passive congestion and active exercise, should be regarded as preventive rather than curative of non-union. That is to say, they should all be energetically adopted in the stage of delayed union, and will then often procure the desired result. But such measures

are simply futile unless there is actual contact between the bone ends. If there is an actual gap due to loss of substance, if there is a wide interposition of soft tissues between the fragments, or if there is a definite false joint, then these non-operative measures are a waste of time and a cause of disappointment.

Bone Suture.—The treatment of ununited fractures by the application of a plate and screws frequently fails, and often leaves the case in a worse condition than it was before this operation. The reasons are obvious. (Fig. 1.) The plate merely acts as an internal splint. It does not bring the bone ends into intimate contact, but on the other hand often tends to hold them apart. And further, the application of the plate necessitates the separation from the bone of the soft tissues which are concerned with its blood supply. The two essentials of successful bone suture are the free removal of sclerosed or atrophic bone, and the firm pressing together of the new-cut surfaces, so that they may quickly unite. Such an operation is exemplified best by what I have described as the " step cut " union of the humerus or femur. (Fig. 2.) The bone ends are first cut free from the fibrous tissue covering their extremities. Then a step is cut from each fragment about one to two inches in length, in such a manner that a Z-shaped junction is fashioned. The ends thus shaped are bolted together (the bolts are $\frac{1}{8}$-inch thick for the humerus or $\frac{3}{16}$ inch for the femur). As an extra measure of precaution, for strength and fixation, a plate may be used as well. This will be fixed by the two bolts concerned in the step cut, and by two or more screws holding each fragment above and below the junction.

Some General Considerations about Bone Grafting.—Before describing the actual method used in grafting a bone in the treatment of an ununited fracture, it may be well to

FIG. 1.

The bones of the forearm of an officer which had been well plated three months previously. The screws have become loose and there is no union. In the second figure the same bones are seen after a bolted step cut operation. Six months later he returned to active service. (From the *British Journal of Surgery*.)

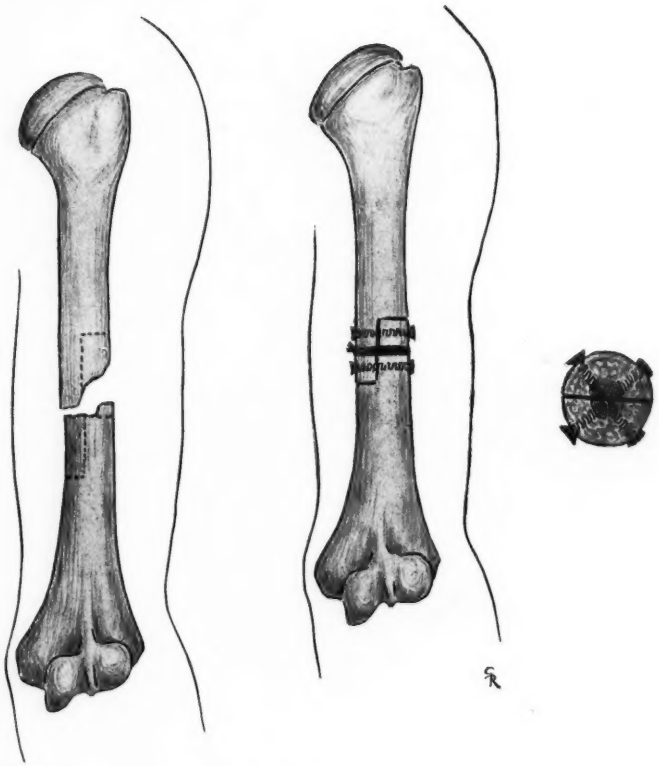


FIG. 2.

Diagram illustrating the "step cut" operation upon the humerus.
(From the *British Journal of Surgery*.)

consider very briefly certain general principles which concern the vitality of bone-grafts. There have been two extreme views taken about the behaviour of a living bone-graft. According to one, the graft is possessed of independent vitality, by reason of which it will grow, establish vital connection, and eventually function as a part of the skeleton. According to the other, the graft is merely a foreign body, which by reason of its animal origin can act as a scaffolding for the deposit of new bone which grows into it from adjacent tissues. There is fact and fallacy in both these extreme views, and the truth lies between them. That an autogenous bone-graft has a vitality of its own is definitely proved by two facts. First, that when the graft undergoes a fracture at a distance from its implanted ends it throws out callus, by which union takes place; and second, that sometimes the central part of a large graft undergoes necrosis and sequestration, whilst the superficial portions survive. Both these phenomena, repair and sequestrum formation, can only be exhibited by living tissues. On the other hand, the vitality of bone-grafts is of a very limited character, and absolutely dependent upon rapid union with tissues of its own kind. This is shown by the facts that a bone-graft remains indolent or undergoes atrophy when it is placed among soft tissues and not attached to living bone, and that if it is merely laid in loose contact with its bony bed it will generally undergo the same fate (see Fig. 5).

To regard the living graft as a mere passive scaffolding is again only partly true. A piece of boiled bone placed in intimate contact with vascular bone will quickly become permeated first with new blood vessels and later with new bone. This has been amply demonstrated recently by Gallie (*Brit. Journ. Surgery*, October, 1919), and it is illustrated by Figs. 3 and 4, which show how an ivory peg used to fix the upper end of the humerus in a boy has

almost become absorbed and transformed into the surrounding bone within two months. If therefore a graft is merely required as a fixative agent, as a bolt, peg, screw or plate, then probably a dead bone will serve as well as a living, because it is surrounded on all sides by living bone which quickly penetrates it. But when an extensive gap has to be filled, and the graft can only be in contact with vascular bone at each end, then the living graft will have a great advantage over the dead, because the intermediate portion, having a vitality of its own, is capable of independent growth, provided that it establishes a new blood supply before its own cells have perished. This last point is an important one. The greater part of the blood supply of a bone is derived through the vessels which enter it through the periosteum. The loose connective tissues of the periosteum is eminently adapted for picking up new vascular adhesions, and therefore it is the most valuable adjunct in maintaining the vitality of the graft.

To secure rapid success in the use of a living graft in the filling of a gap in one of the long bones it is therefore necessary to fulfil the following conditions in addition to those implied by good surgical technique :—

(*a*) The bone bed into which the graft is laid must be freed from atrophic sclerosed and avascular tissue.

(*b*) There must be wide contact between the graft and the vascular bone bed.

(*c*) The graft must be so securely fixed to its bed that no movement between the two can take place.

(*d*) That portion of the graft which lies intermediate between the two embedded ends should be provided with a liberal covering of its own periosteum.

(*e*) The graft should be strong enough to act as a

FIG. 3.

The shoulder of a boy aged 12 who had had a fracture through the surgical neck of the humerus. This had been replaced by open operation, and fixed by an ivory peg $1\frac{1}{2}$ inches long and $\frac{3}{16}$ inch thick.

FIG. 4.

The same case two months later, showing the rapid absorption of the ivory peg.

FIG. 5.

Inefficient method of bone grafting. A small piece of tibia has been laid into the gap of the radius without fixation or contact with healthy bone.

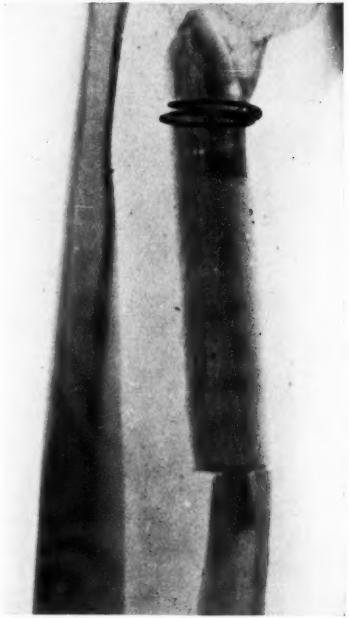


FIG. 6.

The same case treated by an efficient bone-graft.

skeletal strut, by which the deformity of the bone gap is corrected.

It may serve to illustrate some of these points if certain examples are given of the results of their non-observances. Perhaps the commonest type of failure is seen in those cases where a sliding bone-graft has been used to bridge a gap. According to this method, a strip of bone is cut from one fragment and a groove cut in the other, and the strip is then laid across the gap. In this technique both the graft and its bed consist largely of the avascular bone of which the ends are composed, and the graft is so slender that it cannot act as an efficient skeletal strut.

Another type of operation which always fails is seen in Fig. 5, where a small piece of new bone has simply been laid into the gap between the sclerosed bone ends without wide contact or fixation. As a contrast to this Fig. 6 shows the same case successfully treated by the application of a graft which fulfilled all the above requirements.

As regards the various methods of fitting and fixing the grafts, it may be said that wide contact and accurate joinery, which makes dependence upon sutures unnecessary, are the ideals to be aimed at, but that in certain circumstances when secure fixation demand the use of pins, bolts or even a plate, then there should be no more hesitation in using these adjuncts than there is in the application of a splint to the limb after the operation is over. Fig. 7 gives in diagrammatic form, illustrations of various methods of fixing the grafts.

The Radius.—The bones of the forearm offer the best scope for repair of gaps by means of bone-grafting. If both bones are the seat of non-union, then the step cut operation illustrated by Fig. 1 is the best treatment. But if only one bone is affected, then two courses are open. One is to shorten the sound bone so as to bring the ends of the fractured

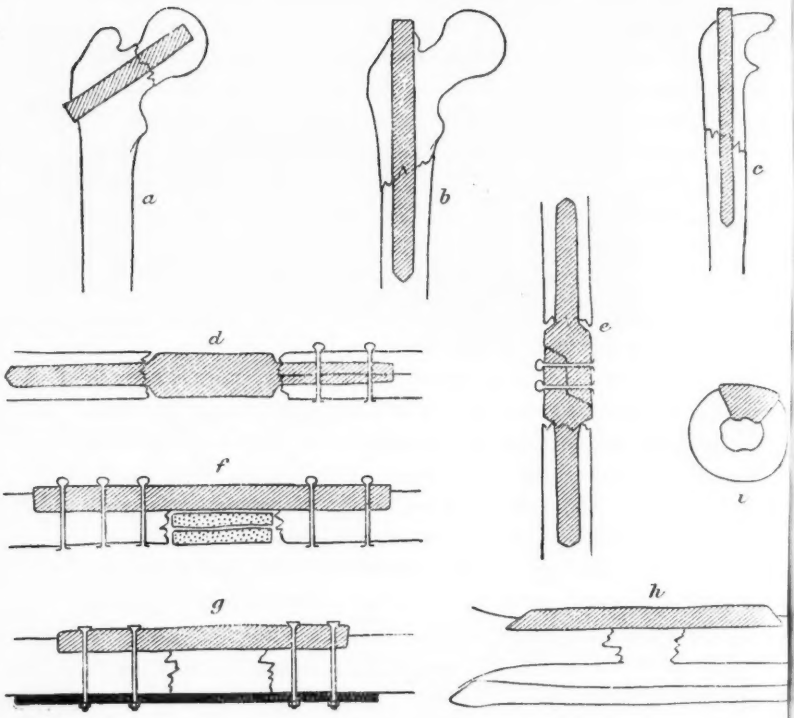


FIG. 7.

Showing methods of fixing and fitting a graft : (*a*) Graft driven into trochanter neck, and head of femur ; (*b*) Graft driven into medulla of upper third of femur from trochanter ; (*c*) Graft driven into medulla of proximal part of ulna from olecranon ; (*d*) Graft tightly fitted into both fragments of a fracture. At one end the shaft has been split for its reception, and then pinned together ; (*e*) Graft tightly fitted into both fragments of a fracture—the graft has been cut by a fret-saw in a **Z** manner and pinned together afterwards ; (*f*) Graft fitted as a cortical strut and fixed by pins—the fragments marked by dots have been cut from the shaft and used to fill up the gap between the main ends of the bone ; (*g*) Graft fitted as a cortical strut and bolted to a plate on the opposite side of the bone ; (*h*) Inlay graft fitted and fixed without metallic sutures ; (*i*) Section of the inlay graft, showing its wedge shape. (From the *British Journal of Surgery*.)

bone together. This often fails because enough of the broken bone ends has not been removed to obtain contact of vascular bone tissue. It should never be adopted unless there is coincident loss of the soft tissues, *i.e.* a gap in the muscles which can only be joined by shortening the forearm.

Gap fractures of the ulna are not of great importance, because such good function of the forearm is possible in the absence of the lower two-thirds of the ulna.

But the gap fracture of the radius is quite another matter. It is an injury which cripples and deforms the hand and makes the grasp weak and rotation of the hand impossible. Having made good the cutaneous scar either by excision or by taking a skin flap from the chest, and having by a preliminary operation removed all the deep scar tissue in which latent infection often lurks, the bone ends are exposed and refreshed by clean transverse saw cuts, which remove all atrophic or sclerosed tissue. Each bone end is then drilled by the largest possible twist drill for about one inch. Usually the proximal end takes a $\frac{5}{16}$ and the distal a $\frac{7}{16}$ drill. The wound is now temporarily closed over a tightly-placed gauze packing. The graft is cut from the crest of the tibia of a length 2 inches longer than the gap to be filled, and of a thickness equal to that of the bone to be replaced. An ample covering of periosteum is preserved in contact with the graft.

The periosteum is turned back from each end of the graft for one inch, and this part is cut down by means of the saw, file and special dowelling tool to the exact size required by the socket into which it is to fit. The graft is put in place by driving one end into the distal fragment and levering the other end into the proximal fragment (if this is done the upper peg end must be cut short to about $\frac{1}{3}$ inch), or placing it into the proximal end by splitting the latter, which is then sutured by two wire loops.

These two methods of placing the fitted graft are shown by Figs. 9 and 11.

Figures from two cases will suffice to illustrate this operation.

In the first the wide removal of the atrophic bone ends and the fitting of the graft without splitting the proximal fragment are seen. (Figs. 8, 9.)

In the second the fitting by splitting is shown, and the later skiagram taken after the lapse of one year demonstrates the massive formation of new bone and the intimate fusion between the graft and its bed. (Figs. 10, 11.)

The Tibia.—The tibia is a much more difficult bone than the radius in which to replace a gap. This is due to the fact that it is so much more superficial and therefore exposed to infection from overlaying scar tissue, and also to its greater avascularity.

Only those cases can be grafted where the anterior skin surface is sound and healthy, as it is quite useless to plan a graft underneath an adherent scar. Furthermore, the tibia is so large a bone that no autogenous graft can be found of a calibre to efficiently replace it. All that can be done is to put an inlay graft into its anterior surface, and to fill up the rest of the gap with the portions taken from the shaft in preparing the bed for the graft. The anterior border and inner surface of the bone is exposed by making a (-shaped flap with its convexity over the outer part of the leg. The ragged ends of the bone are freely cut away, and the surface is exposed for about 8 inches by a I-shaped incision into the periosteum, which is turned back as two lateral flaps. On to this bare surface of bone an aluminium template 6 inches long and ½ inch wide is temporarily fixed by a few small nails, and then by means of a motor saw the anterior wall of the bone is cut out by four cuts on the four sides of

FIG. 8.

Typical gap fracture of the radius with atrophy of both bone ends and displacement of the fragments towards the ulna.

FIG. 9.

The same case after bone-grafting. Note the free removal of unhealthy bone and the complete correction of the deformity.

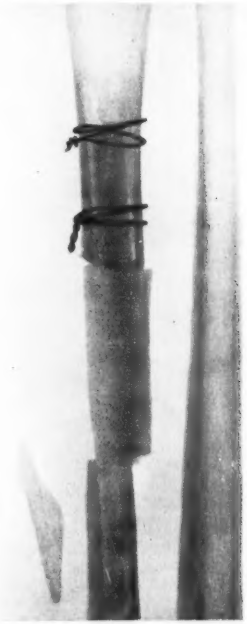


FIG. 10.

Another gap fracture of the radius treated by a bone-graft.

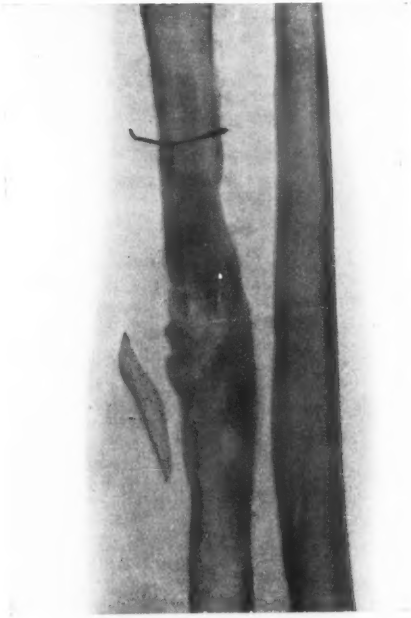


FIG. 11.

The same case a year later, showing the good formation of new bone and the complete fusion between the graft and its bed.

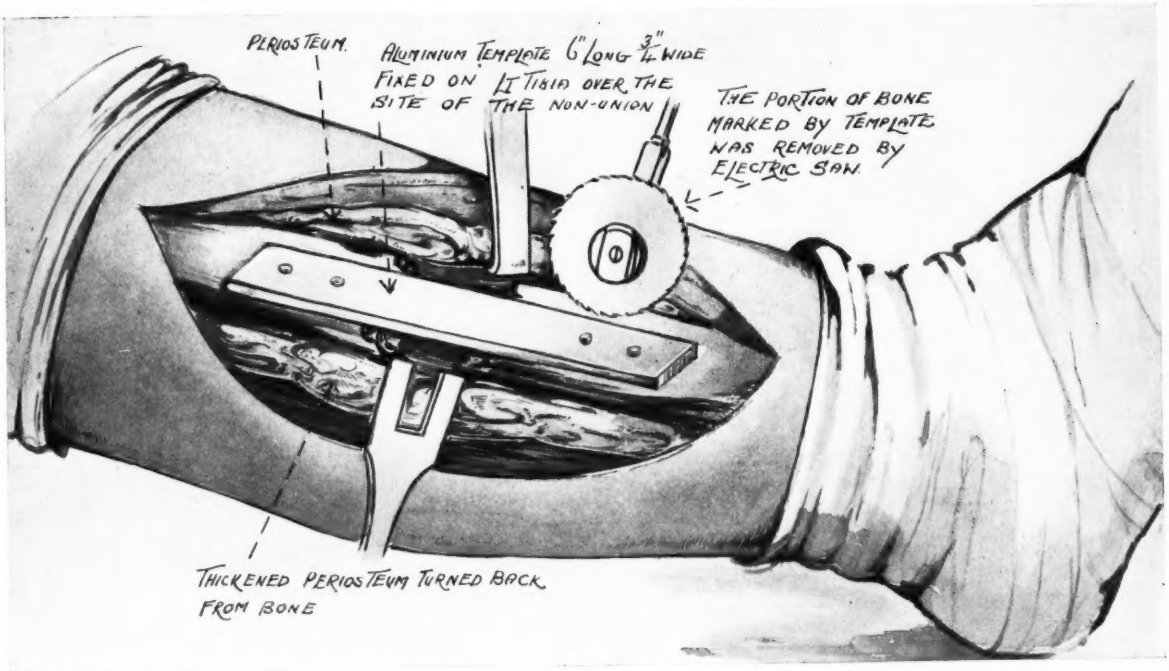


FIG. 12.

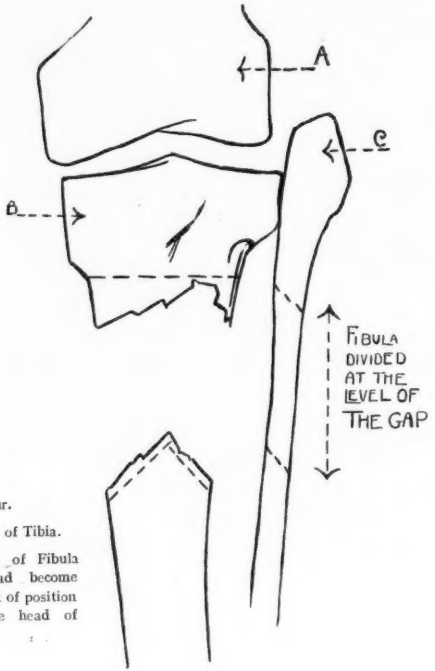
The method of inlay grafting for a gap fracture of the tibia. The template is temporarily nailed in position for guidance of the saw.

the template. The lateral cuts converge towards the centre of the bone, so that the groove comes to have a wedge shape. The bits of bone are removed from the groove by a chisel, and are then removed from the template. Each of these removed pieces of bone is cut of the exact length to fill the gap, and they are then hammered into place so as to fill the back portion of the gap (Fig. 12).

From the opposite tibia the graft is now cut. The anterior surface having been exposed, the periosteum is cut by a parallelogram 7 inches long and 1 inch wide, and the edges of this parallelogram of periosteum are reflected towards the centre of the future graft. Over this periosteum (to which it acts as a protector) an aluminium template is nailed. This is the same length but $\frac{1}{16}$ inch wider than the template used in cutting the groove. This point is important, because if the saw cuts which make the groove and those which make the graft are in each case the same distance apart the graft will be smaller than the groove by the width of two saw cuts, and therefore will be a loose fit.

The graft having been cut by four cuts of a motor saw round the template is removed with the template adhering to it. It is then hammered into place, and should fit so tightly and exactly that no further fixation is required. The template is removed, and the periosteum of the bed is sewn to that of the graft all round. When there is a large gap in the tibia covered by an adherent scar which cannot be replaced it is wise to amputate the leg. But it sometimes happens that the patient has only this one leg. Under such circumstances the actual length of the leg is of not much importance, in fact the shortening of the leg will be a positive advantage. The operation of choice then consists in removing a portion of the fibula and impacting the distal ends of both tibia and fibula into the head of the tibia or its proximal portion. Figs. 13 and 13A illustrate this procedure

The method of inlay grafting for a gap fracture of the tibia. The template is completely



A. Femur.

B. Head of Tibia.

C. Head of Fibula which had become pushed out of position above the head of Tibia.

FIG. 13.

Gap fracture of tibia in a man who had lost the other leg.

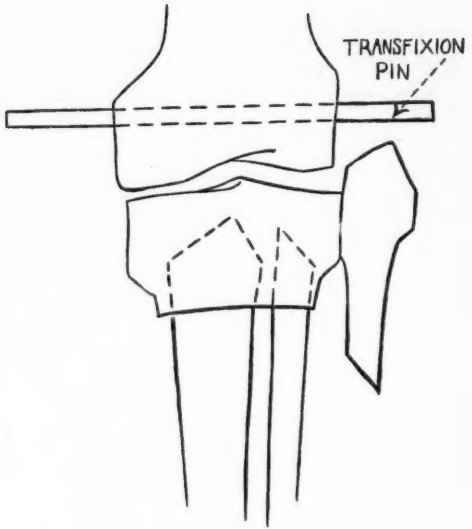


FIG. 13A.

The same after removal of a portion of the fibula and impaction of distal ends of tibia and fibula into head of tibia. The impaction is held secure by driving a transfixion pin through the lower end of the femur, and tying the foot and leg to this by means of a plaster bandage.

Gap fracture of tibia in a man who had lost the other leg.

plaster bandage.

FIG. 14.

Moulded splint for fixing the arm to the trunk before and after bone-grafting of the humerus.

in an actual case where it has been recently carried out with success.

The Humerus.—The humerus is a much more difficult problem than either the radius or the tibia when a large gap has to be made good. This is due to the very great difficulty in fixing the arm after the operation.

The difficulty may be met by putting up the arm in a plaster case which includes the trunk. But there is always a great deal of oozing after these operations, and even if a window is cut over the wound, it is hard to keep the plaster from becoming soiled. The better plan is to prepare a moulded splint (Fig. 14), which is worn for some weeks before the operation, and to which the patient becomes accustomed. But even with this help, it is a most difficult matter to replace any large extent of the humerus by means of a bone-graft.

Moulded splint for fixing the arm to the trunk before and after bone-grafting of the humerus.

For the illustrations in this paper the Author is indebted to Dr. Baldwin (the majority of the skiagrams), Dr. Mackay (Fig. 9), Dr. F. G. Bergin (Figs. 3 and 4), Miss Pillers (Figs. 12 and 14).

The subject of ununited fractures of the femur is so large, that it is postponed for consideration in a further article.

STAMMERING AS IT OCCURRED IN THE WAR.

BY

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Late Captain, R.A.M.C.

DURING the war stammering was a common neurosis in soldiers. It was met with either as a fresh symptom which had never been manifested by the patient in earlier life, as an aggravation of a pre-existing condition, or as a relapse of a disability which had been in abeyance for many years.

The importance of stammering varied with the rank and duties of the soldier; less significant in the private, it was of great importance in the officer or non-commissioned officer.

Now that all ranks are returning to civil life, this disability is a trying one, for in searching for work a man naturally feels himself handicapped if he cannot freely express himself in speech.

In my experience stammering is seldom a mono-symptomatic neurosis, but is accompanied by a certain degree of psychasthenia, manifested by insomnia and night-mares. In this respect it differs from aphonia, the other common functional speech defect, which is not, as a rule, associated with any interference with the mental faculties. Stammering itself, however, is a true hysterical symptom in the sense of Babinski's [1] definition, that hysteria is a condition in which symptoms are present which have been produced by suggestion.

Roussy and L'Hermitte [2] attempt to distinguish between real stammering and hysterical stuttering, but this seems to be an artificial division of a symptom which has a common origin, however and whenever it has arisen.

In the discussion of any hysterical condition, it is necessary to consider what factor originated the suggestion that has been accepted by the patient, and what are the physical and mental abnormalities induced by that suggestion.

A stammer may be acquired in three ways, either under the stress of some emotion, or by imitation, or in the course of recovery from mutism or aphonia. The emotional disturbances which tend to induce stammering are fear and anger, and especially fear. At this point it may be as well to make it quite clear what one means by fear. The emotion of fear is not synonymous with cowardice. Almost everyone is frightened by a sudden loud noise or unexpected blow,

but most people quickly control the fear and therefore their resultant action is not "panicky," and they are not cowards. Thus almost every soldier was constantly being frightened, but very few were cowards.

Many observers from Darwin to Cannon have increased our knowledge of the results of the emotions, and one of the principal expressions of the two most dynamic emotions is an increase in muscular tone. This is at first a beneficial preparation for the co-ordinated action of an attack or retreat, but if this co-ordinated action is prevented, then the energy which ought to be so used is diverted in "expressions" which become exaggerated and detrimental. Amongst other things the hypertonus of the muscles becomes an actual rigidity.

If this affects the muscles of respiration and voice production, stammering may temporarily ensue as a secondary expression of the emotion. Normally this will pass off when the individual regains control over his emotion; but if his suggestibility is high, or temporarily rendered high by confusion or other cause, he may accept the suggestion that stammering has come to stay, and will continue to suffer from this disability.

Imitation is an innate tendency, stronger in some individuals than in others, and more influential in children than in adults. Stammering is often acquired in childhood as the result of imitation, whether of an actual stammerer or of what Scripture [3] calls a "clutterer."

This term is applied to those who speak so rapidly that their words are slurred into each other. If a young child attempts to imitate this he will almost certainly stammer, for the attempt to speak so rapidly will result in spasm of the muscles of the voice production. I have seen several cases where such a history has been quite definitely obtained.

Stammering as a result of imitation also occurred amongst

soldiers, just in the same way as there occurred hysterical gaits and tics as the result of copying others in the wards.

When a soldier has become hysterically mute or aphonic, he very naturally comes to the conclusion that there is some marked obstacle which prevents him talking. If then in the course of treatment as the result of accident he finds he can frame some words or phonate, he is still convinced that he cannot talk properly. So he continues to commit errors in voice production, the result of which is a stammer, which if allowed to develop may be remarkably intractable. Hence, when treating a mute or an aphonic, if he tends to stammer instead of talking properly after regaining his voice, he should never be left in this stage, but treatment should be continued till he talks normally.

Such is the pathogenesis of stammering.

The physical factors will be found to consist of rigidity and wrong use of the muscles of respiration of the larynx and of the mouth. As a rule the muscles in all these regions are at fault at one and the same time, though often one or other group predominates. If the chest muscles are spasmodic, the patient fails to get anything out at all for some instants, then the sentence comes with a rush, the words tumbling over each other in the attempt to complete them before the breath stops again. If the laryngeal and palatal muscles are chiefly at fault, there will be defects over initial vowels, and the harsh, monotonous tone in the voice which is characteristic of stammerers will be noticed. If the action of the labial muscles is spasmodic, stuttering over initial consonants will be the predominant feature of the condition.

The breathing of the stammerer is almost always deficient. If his lung power is tested on a pneumograph, of which the average individual can turn the scale to 240—340, the

stammerer will only succeed in turning it to 100—200 ; moreover, he does not use what breath he has correctly. In voice production phonation should occur during expiration, but the stammerer either tries to produce his voice during inspiration or when the breath is held. Frequently, in addition to the spasms of the muscles involved in speech, there is a "tic" of the facial muscles, so that the patient makes the strangest grimaces when he tries to talk, and in severe cases the arms and even the whole body may share in the universal inco-ordination of muscular action.

Such are the physical symptoms of stammering ; but almost more important than this, because of its great influence on the course of treatment of the trouble, is the mental factor.

This consists in the development of the dread of stammering. The patient loses confidence in his ability to get the words out, so he tries to rush his words before breath fails him. This accounts for the fact that all stammerers talk too fast. This mental symptom is the one which is the most resistant to treatment, and many a "cured" stammerer feels this dread, but by means of some trick manages to avert disaster and prevent his infirmity being discoverable to a casual acquaintance.

One patient of mine, who had a very slight stammer amongst other neurotic symptoms, had a dread of certain words, but he was often able to see them coming in the sentence he was speaking, and having a somewhat agile mind, was able to substitute some other word and thus avert his stammer.

The prognosis of stammering depends on various factors. Those men who have acquired their stammer *de novo* in the war ought to be cured easily, and I have had some cases who have been completely cured within half an hour. Those

who have relapsed during the war, *i.e.* those who have once stammered but have lived a part of their lives without stammering, should be relieved again, but their treatment may take longer owing to the greater intensity of the mental dread of stammering. Some of those who have always stammered can be cured, others relieved so that their speech is better than before the war, while all ought to be raised at least to their pre-war level. The ease of treatment will depend on the amount of intelligent co-operation on the part of the patient, and in severe cases on the amount of perseverance and practice he is prepared to devote to this cure.

In treating the stammerer the first necessity is to establish a bond of confidence between doctor and patient, and the latter must be assured that his condition is anything but hopeless. Next it is desirable to find out how the stammer originated, and explain to the patient the pathogenesis of his condition. This to my mind is an essential in the treatment of all neuroses, and while investigating the origin of his stammer one can inquire into and explain to him the nature of his insomnia and dreams, which often co-exist. The patient must next be instructed as to the faults which determine stammering, viz. too great rapidity of speech and the incorrect use of the breath. He should be placed in a recumbent position with his whole body relaxed, so that he may in this way counteract any tendency to spasm. He is then instructed to take long breaths, and his inefficiency in this respect may be demonstrated to him on a pneumograph, if such an instrument is handy. Once he acquires the art of deep breathing he is told that if he speaks during easy expiration he cannot stammer, and he is instructed to say the word "one" during a long expiration, the breath being emitted "through the word." He is told to count up to ten, taking a long breath between each word,

and he goes on at this until he can do it perfectly. He then takes a long breath and says "one, two" in the single expiration, then "three, four," and so on up to ten. When this is perfect he must enunciate "one, two, three" in one breath, then "four, five, six," and so on up to twelve. Next, four numbers in a breath, then five, and so on till he can count from "one" to "ten" during a single expiration without hesitating. Then in exactly the same way he says his name and address, and short sentences of various kinds. He is next given something simple to read aloud, first in the presence of the doctor alone, and then if possible in the presence of others. In favourable cases this may all be done at one sitting; in less favourable circumstances it may take some time to reach this stage.

When the patient is reading the doctor must insist that he reads slowly, takes plenty of breaths, and never attempts to speak except during expiration. These breathing rules, besides counteracting the actual physical faults, divert the patient's attention from the possibility of stammering, and so relieve the mental factor, and often after cure is practically complete the patient can make use of these breathing rules to avert a stammer which he feels is coming.

In cases where the harsh, monotonous voice due to laryngeal spasm is a prominent feature Scripture's [3] "octave twist" is of great use. The modulation of ordinary speech varies approximately through the interval of a third. By exaggerating this interval to the octave the spasm is overcome. The patient does this by reading aloud, causing the note of each syllable to differ from the last by at least an octave—high, low, high, low, and so on. He should not sing this so much as say it; the distinction is expressed in French by the words "chanteuse" and "diseuse." It is remarkable how soon this exercise improves the expression and modulation of the voice.

Where initial consonant stutter is the trouble another trick is useful. Suppose the patient has a difficulty with "b," so that he says "b-b-b-butter," it will be found that he can say "utter" quite well. He is therefore instructed to put his lips together and say "utter." The result is (b)utter, and after a little practice he achieves "butter." The same can be done with any other consonant, by getting him to place his lips and tongue into the requisite position and then say the word without the first letter.

So far as the mental factor of the loss of confidence is concerned, the patient requires unending encouragement, every improvement must be demonstrated to him, and he must be assured of further success as he finds he can talk better. Thus he gains confidence, so that he is able to talk without any self-consciousness at all, or with so little that he can control it and prevent the stammer by some trick, which he holds in readiness. These methods have on the whole proved very satisfactory in war cases, and have often improved or cured a life-long stammerer, so that it would seem desirable that we should extend the lessons we have learnt during the war to help our civilian patients.

REFERENCES.

[1] J. Babinski and J. Froment, *Pithiatisme et troubles reflex nerveuses.* Collection Horizon. Paris, 1916.

[2] Roussy and L'Hermitte, *Psychonevroses de Guerre.* Collection Horizon. Paris, 1916.

[3] Scripture, *Stammering and Lisping.* New York, 1915.

Progress of the Medical Sciences.

SOME ASPECTS OF MODERN CHEMO-THERAPEUTICS.

A SUMMARY OF LECTURES BY DR. M. NIERENSTEIN.

UNDER this title Dr. M. Nierenstein, Lecturer in Bio-Chemistry to the University of Bristol, has given a course of lectures, summarised here by his kind permission. For some years he has been working (under the direction of Sir Ronald Ross) at the chemistry of the action of drugs on parasites, and this course of lectures gives a brief account of some of his work.

After a remark on the fact that parasiticidal drugs act on the host as well as on the parasite, the first lecture dealt with the action of atoxyl on trypanosomes. If atoxyl is injected into a rat infected with trypanosomiasis the trypanosomes soon show a lessened activity. Seven hours after the injection they are no longer found in the rat's blood. Soon after this the animal loses the symptoms of trypanosomiasis. Yet other rats inoculated with his blood often become infected with trypanosomiasis. After a period which varies with the strain of trypanosome the first rat has a relapse. Suppose this again treated with atoxyl; once more the symptoms disappear, yet the rat's blood is once again found to be infective when inoculated into other rats. As this process is repeated the intervals between the relapses grow shorter, until they practically disappear. The strains secured by inoculation from the original rat into others also become more and more virulent, and at the same time undergo definite modification of structure. Similar structural change can be produced by passing mammalian trypanosomes into birds and then back into mammals. In each case, whether by animal transmission or by habituation to atoxyl, the parasites are made "tougher."

Experiments by Dr. Nierenstein and others suggest that the drug does not act on the parasite direct, but only with the help of the host's serum, this latter playing intermediary between drug and parasite much as a mordant does between dye-stuff and fabric.

The atoxyl inoculations have, then, produced a trypanosome which is resistant to or immunised against atoxyl. This immunity is retained by the parasite during transmission through animals of the same species as that in which the immunity is acquired. So long as rat is inoculated from rat the immunity holds; but if the trypanosome is passed from rat to rabbit it

loses its immunity to atoxyl. Even transmission to the louse destroys the immunity.

Whatever the explanation of these phenomena, three facts are certain: (1) the parasite has been immunised against atoxyl by repeated exposure to that drug in the presence of blood serum; (2) the immune parasite has an enhanced virulence; (3) immunity is lost by transmission through an intermediate host. If these facts were to prove equally applicable to the action of salvarsan on the spirochæta pallida present-day plans for the stamping out of syphilis would need a good deal of modification. Even the development of quinine-resistant plasmodia in malaria is not quite so serious a matter, because passage through an intermediate host, the mosquito, would serve to rob the plasmodium of its immunity.

In the second lecture the relation between chemical constitution and physiological action was discussed. That such a relation exists is well known, but what are its laws? Observations by Dr. Nierenstein and others on the excretion of quinine confirm the belief that there is a constant relation between the concentration of a drug in the blood and that in the urine. Attempts to override this law and saturate the blood with a drug are apt to injure the kidneys and to fail in their object. Supersaturation of the body with quinine was followed, not only by increase in the amount of quinine in the urine, but also by albuminuria. This observation led to a consideration of the means which the body uses in getting rid of drugs. Substances of the caffein group, for example, are merely worked out of the body by an increase in the outflow of urine, a fact which recalls their derivation from urea. Others, such as quinine, undergo oxidation, partial or complete; while others again are altered by addition of substances more complex than oxygen. Carbolic acid, for instance, combines with sulphuric acid to form an excretion product.

The next point was the well-known alteration of physiological action effected by even small changes in chemical constitution. Various examples were quoted by the lecturer, among them the conversion of carbolic into salicylic acid. In 1912 Dr. O. C. M. Davis, of Bristol, compared the chemical activity of a number of the aniline derivatives with their toxicity, and found a definite parallelism. Substances which show strong affinities in the test-tube show them also in the body.

The lecturer alluded to the highly suggestive relation existing between molecular asymmetry and physiological action, quoting Crum Brown's work, which shows that asymmetric compounds of nitrogen, arsenic, antimony, sulphur and even cobalt are alike in exerting a curare effect after injection into the body.

In his third lecture Dr. Nierenstein traced the evolution of the modern organic compounds of arsenic, from cacodyl to salvarsan. This evolution, which aimed at increasing the physiological and therefore the therapeutic activity of the arsenical combination, included two decisive steps. The first was that in which it was determined to combine arsenic with aniline rather than with one of the fatty acid series, presumably because greater physiological activity was expected of the aniline-arsenic compound. In the second, Ehrlich conceived the idea of using chemically unsaturated arsenic compounds, the underlying idea being a comparison between the physiological activity of the unsaturated carbon monoxide and the saturated carbon dioxide. It was thus that he arrived at salvarsan and its more soluble derivative neo-salvarsan. Finally, others have combined copper, silver and other antiseptics with salvarsan, a latter-day equivalent of the ancient "buck-shot" prescription. Indeed, one cannot but be struck by the thought that throughout this development of a complex arsenical molecule the same spirit of empiricism that prompted the older physicians to try a drug and see what happened has been at work, albeit under the guise of scientific infallibility.

In the fourth lecture certain elaborations of the idea of synthesising compounds for therapeutic purposes were examined. First, the steps adopted for using antimony in organic compounds, instead of or in addition to arsenic, were briefly described. The rationale of this proceeding is, of course, to be found in the atomic similarities between arsenic and antimony. After showing that the use of antimony had on the whole been disappointing, the lecturer asked why more attention had not been concentrated on phosphorus, an element lying midway between nitrogen and arsenic. He pointed to the fact that phosphorus is normally present in protoplasm, which suggests that its compounds might be more easily assimilated than those of arsenic. He thought that research in this direction, however laborious, could not properly be neglected.

Second, experiments with dyes were summarised. These chiefly concerned two groups of substances, the diazo compounds and the triphenyl-methane series. The attempt to apply these substances to the killing of parasites was prompted by their known and visible union with the protoplasm of the parasites. Briefly, the results in this direction are disappointing.

The last lecture was in many respects the most interesting of all; partly because it was based almost entirely on Dr. Nierenstein's recent work, partly because its subject, the parasiticidal action of quinine, is one which must always have a deep interest for British medicine. The first point made

was the chemical relation between the three principal alkaloids of cinchona. Cinchonine is the simplest and least parasiticidal. A small addition to its molecule converts it into cuprein, which is rather more powerful in its action on plasmodia. A further small addition brings us to quinine, the most active of all. By a further expansion of the molecule the compound ethyl-hydrocuprein is formed, which has no effect on the malaria parasite, but inhibits the growth of pneumococci.

The lecturer next passed to a consideration of the fate of quinine within the body. Its excretion as such in the urine was first definitely proved about sixty years ago by Dr. Herapath of the Bristol Medical School. The test which he devised is, as Dr. Nierenstein's researches showed, still the most reliable known. By its use traces of 1 in 15,000,000 can be detected. Approximately 50 per cent. of the quinine taken is excreted as such. The method by which it is administered does not alter this, neither does it influence the rate at which the drug is excreted.

As to the fate of the remainder of the quinine taken not much is known. Dr. Nierenstein discovered two disintegration products, quitinine and hæmoquinic acid, in the urine, and he is inclined to think that the action of the drug in malarial plasmodia is exercised by substances similar to these and not by quinine itself. The quinine molecule has no amino group or other physiologically active radicles. Hæmoquinic acid has not yet been tested, but quitinine (which Ramsden of Liverpool has shown to be formed by oxidation of quinine by means of liver emulsion) has no effect on malaria. There are, however, substances which have been synthetically prepared which have an action on malaria. The molecule of quinine itself has not yet been synthesised, but these synthetic products represent a stage in the synthesis of quinine; the molecule of each is a part of the molecule of quinine.

There may well be a future for bio-chemical research into the action of quinine. It might be possible to improve upon the therapeutic effect of quinine, either by the introduction of amino groups into its molecule or by synthesis. If the synthetic compounds referred to above act on the malaria plasmodium, and if quinine itself acts by virtue of metabolising into something not unlike those compounds, it might be possible to hit upon a molecule which had all the anti-malarial properties of quinine. To give such a compound would be more economical than giving quinine, because all of it would act, and none would pass through the body inactive, as appears to be the case with a large portion of the quinine administered.

Such a research would provide a field for that co-operation between clinician and scientist which was advocated in this

year's Presidential Address to the Medico-Chirurgical Society. And it would furnish an interesting and highly significant contrast to the search for an arsenical spirillicide already alluded to in these notes. It would take account of the fact that quinine is good for the treatment of malaria, whereas the researches that culminated in salvarsan appear to have ignored in an indefensible degree the proved value of mercury in the treatment of syphilis. Possibly this mistake might have been avoided if there had been a closer collaboration between chemist and clinician.

CAREY COOMBS.

FOURTH INTER-ALLIED SURGICAL CONFERENCE FOR THE STUDY OF WAR WOUNDS.

(*Paris, October*, 1919.)

CONCLUSIONS ADOPTED ON THE VARIOUS QUESTIONS SUBMITTED FOR DISCUSSION.

Immunisation.—Amongst wound infections tetanus and gas gangrene have been effectively dealt with by means of immunisation. The immunisation has been obtained by serum therapy.[1]

Tetanus.

I. PREVENTIVE SERUM THERAPY.

A. The experience of the war has cofirmed the preventive value of anti-tetanic serum. The records show that :

B. Tetanus almost completely disappeared after the first months of the war.

C. This diminution was due above everything else to preventive serum therapy.

D. Improvements in surgical treatment played their part in this result.

E. Serum should be injected as early as possible after the wound is inflicted.

(*a*) In the French and Belgian armies after the initial injection a second injection is usually given on the 7th to 10th day after wounding. The routine dose consists of 4,000 antitoxic units[2] contained in 10 c.c. of serum.

(*b*) In the British and Portuguese armies the following procedure is recommended : after the initial injection prophylactic injections are repeated every seven days so long as the wound remains open.

It is unnecessary to go beyond four doses. Each injection consists of 500 antitoxic units (U.S.).[3]

(*c*) In the Italian army every case was given two injections of A.T.S. at twenty-four hours' interval. In certain severe cases a third injection was given about the 7th day.

(*d*) In the American Army (U.S.) a single injection of 1,500 (U.S.) units of A.T.S. was recommended, to be given as early as possible after wounding. The injection was not repeated unless symptoms of tetanus appeared or later operations had to be performed.

G. Any later operation renders a further injection necessary.

E. When, as rarely happened, tetanus developed in spite of prophylactic inoculation, its clinical severity was often very mild.

II. CURATIVE TREATMENT, CURATIVE SERUM THERAPY.

A. Serum therapy is innocuous as a curative measure provided the necessary precautions are taken against anaphylaxis on giving intravenous or intraspinal injections.

B. The question of the efficacy of curative serum therapy requires further study.

Gas Gangrene.—The conclusions agreed upon at the last session remain unaltered.

Late Results in Fractures of the Femur.—The late results as seen during the war varied according to the period of the war in which the fractures of the femur occurred.

1. At the beginning of the war the results were bad. The lack of good pparatus for immediate immobilisation and transport, the inadequacy of treatment and splinting account for these deplorable results.

2. During a second period, which may be reckoned as beginning towards the end of 1916, the end-results improved by reason of the routine disinfection of wounds, the advances made in surgical technique, in the early splinting, and in splinting during later treatment. The institution of special centres had, from this point of view, the best effect.

3. During active fighting, even in this second period, the results were often less satisfactory than in quiet times. This was due not to defective surgical methods, but to the inrush of wounded, which prevented the application of these methods fully and vigorously.

We have not actually sufficient data to enable us to determine the proportion of late complications following fracture of the femur, that is to say, shortening, deformities, osteomyelitis, interference with the action of the knee-joint, of the hip or foot; but the decrease in the number and in the severity of these complications during the last two years of the war justify the following conclusions :—

Disinfection of the site of fracture by operation or chemical methods, followed by primary or secondary suture, diminished

considerably the number of cases of osteomyelitis and its sequels. Reduction of fractures of the shaft by extension is the method of choice, provided that it is always combined with early movement of the joints. Every effort of the surgeon should be directed to averting ankylosis or stiffness of the knee, which appears to be still a too common sequel. For infra-trochanteric fractures extension in abduction gives the best results.

In fractures of the lower third and near the condyles which cannot be reduced by continuous extension, direct traction on the condyles or osteo-synthesis are the methods which appear to lead to the most satisfactory anatomical and functional results.

Faulty unions with angular deformity or rotation which have been treated by osteotomy, either with or without osteo-synthesis have in many cases been improved. In every case coming under observation early movements, active or passive, should be carried out.

Surgical Treatment of Scars.—Only scars of the limbs and trunk have been reported upon.

A. PREVENTIVE TREATMENT.—Other things being equal, the great cause of vicious scarring is suppuration of wounds. Preventive treatment of infection in war wounds consists of anatomical repair of the region by primary suture, which at the same time constitutes the preventive treatment of vicious scarring.

B. CURATIVE TREATMENT.—In closed scars, either contracted or adherent, physiotherapy (*i.e.* treatment by electricity, massage movements, hot baths, ionisation, radium therapy, etc.) patiently persisted in is capable of yielding excellent results. It should be replaced by operative treatment when no further benefit is produced, or when the cicatrix is old.

(*a*) *Operative Treatment.*—In contracting scars (especially those that involve the superficial planes) the whole surface and depth of the scar must be excised, the skin edges must be brought together and sutured without tension. This can be rendered possible by free mobilisation of the edges of the wound obtained according to the nature of the case either by sub-cutaneous undercutting, by autoplasty, or by progressive distension of the skin following Morestin's method.

Speaking generally, grafts of any sort give results inferior to autoplastic methods.

In adherent deep scars involving muscles, tendons, or bone excision of the scar *en bloc* should be performed, and the various anatomical planes (muscles, aponeurosis, skin) of the region reconstructed by suture of each separately.

Where there has been extensive destruction of tendons different methods may be adopted, particularly the use of

hetero-plastic grafts (methods of Nageotte-Sencert). The operation may be long and difficult, and it may be advisable to do it in several stages.

Ulcerated scars which cannot be excised may be dealt with by incisions round the circumference of the scar or by Thiersch grafts.

(*b*) *Post-operative Treatment.*—Physiotherapeutic treatment at a subsequent stage is recommended in most cases.

Late Results of Joint Wounds.

1. Punctured bullet wounds of joints which have not been operated on often (the proportion cannot be determined) cause fixation and grating of the joint. This grating is produced by cartilaginous injuries (velvety conditions), without direct connection with the track of the projectile.

2. Lateral arthrotomy, with suture, has given after long interval very good results. Transtendinous arthrotomy has given much less satisfactory results, and is generally followed by limitation of movements. Sometimes after lateral arthrotomy a considerable laxity of the joint occurs, apparently due to prolonged distension by sero-sanguineous effusion.

3. Primary resection performed strictly according to Ollier's sub-capsular periosteal method has given good functional results as regards firmness and mobility. Remarkable bony regeneration generally follows.

4. Resection whilst the pyrexia continues (by Ollier's method) generally gives good functional results.

5. As regards the value of immediate active movements in the treatment of non-infected joint wounds and in purulent arthritis the conclusions adopted at previous conferences should be referred to. The functional results have been maintained over long period, and in certain cases further improvement is seen quite late.

The late effects of Chest Wounds.—These must be considered separately from the surgical and medical point of view.

A. SURGICAL.—(*a*) *Small Wounds, Closed Thorax, without Surgical Intervention.*—The degree of recovery of function depends principally upon the resolution of the hæmothorax.

If the effusion is *limited* and aseptic, there may be perfect recovery. Non-infected hæmothorax, which is abundant and persistent, leaves anatomical and functional changes in the shape of pleuro-pulmonary adhesions, which form particularly in the costo-diaphragmatic cul-de-sac.

With a retained missile absolute tolerance may exist; on the other hand, functional troubles which are occasionally serious, or even delayed infection, may supervene.

(*b*) *Wounds requiring Immediate Operation.* Complete immediate thoracotomy usually gives good late results. The more limited the bony injury the better the result. From this

point of view large flaps are very inferior to limited rib-resection as a mode of access to the thorax.

(*c*) *Wounds requiring Secondary Operation for Infection.*—Operations for empyema or infected hæmothorax have proved in their anatomical and functional results far less satisfactory than immediate operations. Thoracic function is the more completely restored according as the bony interference for drainage has been the less extensive and the cure most rapid.

Methods of pleural sterilisation (Tuffier-Depage), allowing of secondary suture, have secured functional recovery superior to those which allow of secondary scarring by granulation or extensive costal resection.

In cases of persistent intractable fistula operations for freeing the lung from its fibrous envelope (pleurectomy) have furnished better functional results than extensive thoracoplastics or thoracectomies. The latter should no longer be employed save for exceptional conditions.

(*d*) *Wounds requiring Secondary Operation for any other cause than Infection, especially for Secondary Extraction of Missiles.*—The results of secondary operation for extraction of missiles have as a rule been good.

B. MEDICAL.—1. Late parietal cicatrisation, in proportion to its extent, is a cause of more or less important diminution of functional capacity. Fistulas (bony or pleural) indicate the persistence of an active focus and call for operation.

2. Pleural scars may according to their extent cause varying degrees of interference with respiration. They may give rise to no interference. Encysted collections may form in the course of evolution (remains of hæmatoma or re-infection of an old focus).

3. Pulmonary sequels may also be either definitive or evolutive. Definitive or cicatricial lesions lead to respiratory embarrassment which is often incurable, or to an embarrassment capable of gradual improvement by breathing exercises.

Evolutive lesions occur in the form of local inflammatory foci and encysted effusions, and cystic hæmatomas which may one day suppurate and end by cavity formation.

4. Patients with old chest wounds often complain of pains, dyspnœa and palpitations, sequels which may originate in damage to the mediastinal nerves or the cardiac plexus, even when no missile is retained. One should not hastily suspect malingering or exaggeration even though there is complete absence of radioscopic or stethoscopic signs.

5. The pleuro-pulmonary sequels of chest wounds may often develop into general symptoms (hæmoptysis, dyspnœa, pyrexia, and physical signs) which may be mistaken for tuberculosis. The frequency of post-traumatic tuberculosis has been exaggerated; in reality it is exceptional. A physician's first

duty is to avoid mistakes in diagnosis, and therefore never to omit to examine for bacilli. Moreover, in cases of proved tuberculosis it is very difficult to state positively that it was caused by the trauma; this is a surmise based on the estimate of the time which has elapsed between the trauma and the first appearance of symptoms. Finally, when there has been pre-existing tuberculosis one wants to know whether the trauma has lit up quiescent disease, or aggravated it, or whether the tuberculosis has pursued its normal course.

NOTE.—In the Italian army immediate artificial pneumothorax has been performed to procure hæmostasis and to prevent infection. This method has given satisfactory anatomical and functional results both immediately and subsequently.

Late Results of Head Wounds.

I. Cerebral complications following wounds of the skull and brain are not so common as was believed before the war.

II. Secondary abscess of the brain appears to have usually a very definite origin; it is due in most instances to a projectile or foreign body retained in the brain substance. It became less common directly the treatment was adopted of routine immediate removal of projectiles or foreign bodies, together with thorough cleansing and disinfection of the track followed by primary or secondary suture of the wound.

III. The onset of cerebral abscess is often insidious, it may occur after varying lapse of time, even after a considerable interval.

IV. Late meningo-encephalitis is equally rare; occasionally it may develop suddenly.

V. Of all complications of head wounds epilepsy seems the commonest and the most grave (10 per cent. of cases).

VI. It is frequently of a generalised character from the outset, more rarely it assumes the Jacksonian type.

VII. It is often difficult to determine the cause of the complications or the site of the lesion which excites them.

The general conclusions, especially those relating to secondary operations, confirm those of the 1917 Conference.

Late Results of Wounds of the Spinal Cord.—1. The late results of spinal-cord wounds can only be observed in a limited number of cases because the prognosis of such wounds is very grave in the early stages. The mortality in the first few days or weeks was about 60 per cent. in the ambulances of the armies.

2. Complete division of the cord by bullet or shell fragment is almost without exception fatal within a few days or weeks. In such cases as survive phenomena of automatism can be recognised in the lower segment of the cord.

3. Cases surviving partial division of the cord, myelomalacia, or hæmatomyelia often remain permanent paraplegics. Some become bed-ridden with sloughy sores, œdema, and

urinary infections, others retain the power of certain movements and can walk with crutches, while others make even further progress. The prognosis depends also upon the extent of the lesion in length and depth.

4. Lesions involving only half the cord with Brown-Sequard syndrome and transverse posterior hemisections of the cord are less serious in prognosis, and improvement has often been observed.

5. Paraplegic symptoms due to simple compression of the cord by hæmatorachis or sub-arachnoid hæmorrhages round the cord are capable of improvement, even the pain due to irritation of the nerve-roots by bony compression may be cured by removal of the compressing fragments.

6. The prognosis in injuries of the *Cauda equina* is less serious than in those of the cord. Cases that do not die quickly of meningeal complications often improve in the course of weeks or months.

7. Paraplegia due to concussion of the spinal cord, and to hæmatomyelia without lesion of the dura mater has a better prognosis than that due to destructive changes caused by projectiles which have penetrated the dura mater. The same remark applies to hæmatomyelia due to the explosive effects of H.E. without external wounds.

The gravity of the prognosis in spinal-cord wounds depends on meningeal, pulmonary, vesical and renal complications, on bed-sores, on derangements of the sympathetic innervation of the abdominal viscera and endocrine glands, on bulbar anæmia and on organic defects which predispose to terminal infections. Finally, it must be borne in mind that paraplegics who survive often remain from the social point of view confirmed invalids.—Reprinted from *La Presse Medicale*, Nov., 1919.

REFERENCES.

[1] In the Italian army injection of anti-diphtheritic serum has given most satisfactory results in cases of diphtheritic infection of wounds.

[2] The French antitoxin unit represents the quantity of serum required to counteract 100 fatal doses of toxin. A fatal dose of toxin is calculated as the amount necessary to kill a guinea-pig weighing 350 grammes in $4\frac{1}{2}$ to 5 days after inoculation into the muscles of the thigh.

[3] The United States antitoxin unit according to Rosneau's definition represents ten times the quantity of serum required to counteract 100 minimal fatal doses. A minimal fatal dose is calculated as the smallest quantity which injected subcutaneously will kill a guinea-pig weighing 350 grammes in four days.

Reviews of Books.

Hysterical Disorders of Warfare. By LEWIS R. YEALLAND, M.D. Pp. xii., 252. With Preface by E. FARQUHAR BUZZARD, M.D., F.R.C.P., Lieut.-Col., R.A.M.C. London: Macmillan & Co. Ltd. 1918. Price 7s. 6d. net.

This is a most interesting and remarkable book, both as regards the conception of hysteria and the methods of treatment employed with such success. We cannot help thinking that the personality of the author, his marvellous determination, tact, and good humour, as shown in these pages, is not the least striking of the series of human pictures here detailed. He had studied mental disease in asylum work before turning to the neurological field at the Queen Square Hospital, and the war gave him an unrivalled opportunity of putting his theories to practical use. He has wasted no time in discussing the views which have been taken of the nature of hysteria, but enters at once into the comparison of the symptoms of those disorders due to structural changes and those which are functional or hysterical. With each group of disorders he gives illustrative cases and a minute account of his treatment in each. These forty cases are the most remarkable part of the book. In each we are shown the steps by which he enlisted the patients' co-operation, and by which he more or less rapidly overcame the paralysis tremor or anæsthesia. We are left, however, in doubt how far these records are a verbatim account of what really took place, and if so, how they were taken down, but the conversations go on without a break. The little remarks of the patients, their criticisms and objections, their temporary failures and final success are laid before us in a series of graphic pictures, in which every step is portrayed in the most lifelike manner.

His principle, as Dr. Buzzard tells us in the preface, is based on the belief that a disorder due to suggestion should yield to counter-suggestion. The method of counter-suggestion is immaterial provided only that it is sufficiently forcible. It must be varied with the mental attitude of the patient. A Faradic battery may or may not be used as a means of suggestion, but above all the personality of the medical man must express complete knowledge of his case, untiring determination, tact and decision in every emergency. Practically every case was brought to a successful conclusion at one sitting, though that might require hours, and the patient left the room walking,

talking or seeing as well as he had ever done before his illness. We might be disposed to refuse credence to the results of this method, but the number of patients who are known to have been cured both by the author and under Colonel Hurst at Seal Hayne is too great to allow any doubt. The average duration of the functional paralysis or similar disorder before coming under the author's treatment was a year. Exhausted patients, it was found, required some rest before beginning, but when begun the treatment should be carried out without a stop if possible.

With a paralysed or dumb patient, for instance, he impresses upon him that his condition is thoroughly understood, and that he is going to be cured, and that the doctor will not leave until he is cured. He gets the patient to show that he is willing and anxious to be cured, and in a suitable case he explains that there is a negativism or tendency to opposition in the mind which hinders the will being carried out into action. He uses first persuasion, adding Faradism just sufficient to produce a movement in the paralysed limb to demonstrate to the patient that movement is really there, and assures him that the obstruction being overcome, he can hold it in the new position and move it himself as the current is reduced. If he fails to do so the current is increased till his attention is excited and he succeeds. It may be necessary to go on to vigorous compulsion, but usually the patient carries out readily enough his directions, though clumsily and feebly at first as he goes on to order fresh exertions and movements. Frequently antagonistic contractions of other muscles now come on, which he treats by gentle and then increasing Faradism or tires them out by passive movements until the patient can move the limb normally. This takes a long time, but if necessary the patient must continue without interruption the re-education of the movements till he can talk or walk perfectly. The twin principles are persuasion and compulsion, and these must be met by willingness and attention on the part of the patient. Where the willingness is great little compulsion is needful.

He points out the curious fact that in many patients the early stage is one of complete flaccid paralysis. This improves a little under ordinary treatment by massage and Faradism, but rigidity from contraction of antagonistic muscles comes on and is accompanied by pain and sometimes by chronic spasms. Thus rigidity is a less complete stage than flaccidity. Now it is important not to let these patients try to walk till the rigidity has been overcome by vigorous passive movements or Faradism applied to the antagonistic muscles. This is employed as they carry out simple movements in bed, and as soon as the spasm ceases they are drilled in walking properly.

The most complete certainty of diagnosis is necessary lest

we mistake organic disease, such as myelitis, for functional conditions, and the author spares no pains in accumulating the diagnostic signs.

We are interested to find that he inclines to the view that hemianæsthesia does exist of itself in many of these patients, and is not due to suggestion by the physician as some authorities lay down. Right hemianæsthesia is curiously often associated with defects of speech.

Two slight misprints occur. On page 105 the words "no such" have dropped out in the sixth line from the bottom and on page 125 the words "of hysterical origin" are needed in the eighth line from the bottom.

The Future of Medicine. By Sir JAMES MACKENZIE, F.R.S., M.D., etc., Consulting Physician to the London Hospital. Pp. 288. London: Oxford Medical Publications. 1919. Price 8s. 6d.

Two ideas are responsible for a large portion of this volume, (*a*) the deficiencies and failure of medical education, for which the inefficiency of the teachers is mainly responsible, and (*b*) the opportunities and advantages of the general practitioner, who, in consequence of the imperfections of his training, has to go blundering on for many years before he becomes satisfied with his work. The author had no thought of research, as for many years he believed that the great physicians had solved all the problems essential to the recognition of the signs of disease. His eyes were ultimately opened, and the results of his own research work lie patent. Much of this is described in the constructive chapters from page 124, and forms the most useful portion of the book. On previous pages he describes the clinical polygraph, an ingenious elaboration founded on Dudgeon's sphygmograph, on which many useful discoveries have been made, and whereby our improved views as regards irregular heart, auricular fibrillation, the varieties and details of mitral stenosis, and the assessment of the values of symptoms as the ground of prognosis, and other results of the author's research have been established.

It is remarkable to find that the author rather deprecates scientific and laboratory methods, which at the present day are universally encouraged, for he considers that physicians of fifty years ago were able to take a broader outlook than the better trained men of modern days.

There is much to be said in favour of the view that laboratory apparatus gives only a one-sided view of things, whereas the physician should see things from every possible standpoint and

form his conclusions accordingly. The general practitioner, doubtless, has many advantages, but these need not depreciate the merits of the consulting physician and the specialist in the way the author does in many of his pages, the more so as he himself has become one of the highly trained group who can afford to be generous to those who may have had fewer advantages.

We think the future of medicine is not so hopeless as is suggested.

Surgical Aspects of Typhoid and Paratyphoid Fevers. By A. E. WEBB-JOHNSON, D.S.O., M.B., Ch.B., Temp. Col., A.M.S. Pp. 190. London: Oxford Medical Publications. 1919. Price 10s. 6d. net.

This interesting and pleasantly-written book is based on the author's Hunterian Lecture delivered in 1917, and deals with cases admitted to 14 Stationary Hospital during the first two years of the war. By way of introduction there is a short historical account of the evolution of our clinical and pathological knowledge of these diseases, embellished with reproductions of portraits of the noted men whose observations have gradually built up the structure of our present conceptions. Indeed, the author takes such a considerable interest in medical history that he cannot refrain from further decorating his work by portraits of Henry, Prince of Wales, the earliest English example of a death from typhoid, and of the statue of Jenner at Boulogne, as the "founder of scientific protective inoculation."

The main portion of the book is devoted to a succinct but exhaustive account of the complications of the enteric group of fevers (which, by the way, the author frequently calls the "Typhoid" group), with directions for the surgical treatment of such as are amenable to operative interference. The fact, however, which is most strongly brought out by these chapters is the comparative rarity of complications in protected individuals and the few instances in which surgical treatment is necessary or particularly successful. It is, in fact, a gratifying tribute from a distinguished surgeon to the success with which his medical and pathological colleagues have wrested from him the opportunities of utilising his skill and experience.

Of course, the one outstanding instance of a typhoid complication in which surgical intervention is the only hope is perforation of the intestine. Of this there were fourteen examples in 2,500 cases, and only three in inoculated patients. Six underwent operation with one recovery, the remaining five

all died. It is remarkable that in 821 typhoid patients who had been inoculated the incidence of perforation was only 0.36 per cent., whereas in 297 not inoculated the percentage of perforation was 2.02. An interesting account is given of the relation of appendicitis to enteric fevers, and of the puzzling cases in which a generalised peritonitis occurs without perforation or other macroscopic evidence of how it arose.

The other suppurative complications of the enteric fevers are very fully described, and the general impression derived from the author's account of them is that visceral abscess formation is rare, often difficult to diagnose and locate, and usually occurs in patients in a profound toxæmic or pyæmic condition, whose recovery is very doubtful even after prompt and efficient surgical treatment.

The last chapter deals with " carriers," and is an excellent review of the present position of the subject, though the author's deductions are based mainly on his experience of acute clinical cases.

The book will be found useful by physicians as well as surgeons, as it necessarily deals mainly with points on the confines of medicine and surgery; and if the complications with which it deals become progressively rarer in practice, all the more does it behove the physician to know about them if he would avoid unpleasant surprises in the *post-mortem* room. We commend this book therefore to all practitioners, who will find in it a valuable store of information presented in a very attractive form.

Typhoid Fever. By FREDERICK P. GAY, Professor of Pathology in the University of California. Pp. xi., 286. New York: The Macmillan Company. 1918. Price 12s. 6d. net.

This exhaustive and closely-printed work is not intended as a clinical or pathological manual, but as a critical précis of our present knowledge of the development and spread of typhoid and paratyphoid, and of the methods employed in its diagnosis, prevention and treatment. There is a bibliography of over forty pages, which will give some idea of the immense material which it embraces in its far-reaching *conspectus*. The author's scheme is an ambitious one, and he has carried it out with much judgment and success. The book, however, suffers somewhat in that it could not include the completed evidence on the bacteriological and serological aspects of the subject amassed during the Great War. Though there is no index, the schematic table of contents is a good guide to the work, and it may be recommended as a useful book of reference to those desiring to study the complicated problems presented by the epidemiology and pathology of the enteric diseases.

Diseases of the Heart. By FREDERICK W. PRICE, M.D. Pp. xiv., 472. London: Oxford Medical Publications. 1918. Price 21s. net.

Dr. F. W. Price is well known as an enthusiastic collector of polygraphic and electro-cardiographic records. Around an excellent selection of these he has put together a book which may be regarded as a very fair summary of "cardiology" viewed from the standpoint of the physiological school. The new syndromes of disordered function are clearly described, and the book should help medical men to understand what is admittedly a difficult bit of clinical medicine. The writer's standpoint may perhaps be gauged by the fact that he devotes fifteen pages to heart block and one to cardiac syphilis. We note that "mitral regurgitation" is still described as a disease. The new cardiology has not yet realised that it is only a symptom.

Psychoses of the War, including Neurasthenia and Shell Shock. By H. C. MARR, M.D. Pp. xiii., 292. London: Oxford Medical Publications. 1919. Price 16s. net.

Dr. Marr gives in this book a full and vivid account of the different types of psychoses which he has met with during and as the result of the war. He has had wide experience of such cases in the later stages both in Malta and as Neurological Consultant in the Scottish Command.

The clinical descriptions are excellent, although occasionally one is inclined to recall C. S. Myers' warning: "In this country, at least, we have been paying so much attention to the mental aspect of the war neuroses that a detailed examination of the accompanying bodily symptoms has been generally neglected." Dr. Marr finds room to include as psychoses of the war a considerable group of physical injuries and diseases under his classification of organic neurasthenia. Your reviewer, with experience of and wide responsibility for cases of war neuroses in front line units, found that it was of the utmost importance to weed out the organic injuries and diseases, especially the acute and chronic infections, from the purely psychical cases at the earliest possible opportunity.

It is striking to find many cases reported without reference to the question of previous syphilitic infection, and apparently without resort to the Wassermann reaction.

Still, as a study of war psychoses from the mental view point it is an interesting contribution. The methods of observation

and case taking in the appendix which follows the general index are helpful and suggestive. There full attention is directed to the " examination of the general bodily system."

On the whole this is not a book for beginners in the subject. The classification of neurasthenia, and the views on cerebral localisation of psychical processes are not those universally accepted. But it will be read with profit and pleasure by those who with some knowledge of other views on psychology and with first-hand experience of war neuroses can appreciate the undoubted value of Dr. Marr's observations.

The volume is got up in the excellent manner we have grown to associate with the Oxford Medical Publications, and it is of handy size.

The Diagnosis and Treatment of Venereal Diseases in General Practice. By L. W. HARRISON, D.S.O., Lieut.-Col., R.A.M.C. Pp. xvii., 482. London: Oxford Medical Publications. 1918. Price 21s. net.

Now that the subject of venereal disease has attracted more general interest among the lay people than ever before, and now that the suppression of unqualified practice in venereal disease has obtained a more stringent legal sanction, it is reasonable for the public to look to the general practitioner for a thorough knowledge of the diagnosis and treatment of these diseases.

In order to assist the general practitioner in obtaining this necessary knowledge, Lieut.-Col. Harrison has written this text-book from a wealth of clinical material and experience, and it may justly be considered as the standard text-book on venereal diseases in English.

While concise, it omits nothing of importance, yet it brings the student up to date in modern diagnosis and the technique of treatment.

The use and abuse of Salvarsan and its substitutes receive ample notice, as should be the case in a modern text-book on the subject, and the position and reliability of the Wassermann test is discussed with judgment and experience.

The book is admirably compiled and arranged, while the illustrations are excellent and well reproduced.

By its arrangement in paragraphs the book is easy of reference, and a good index helps materially to this end.

The author is recognised as the foremost authority in the treatment of venereal diseases in this country, and he is very much to be congratulated in that he has managed to produce so admirable a work during the war.

A Vision of the Possible. What the R.A.M.C. Might Become. By Sir JAMES W. BARRETT, C.B., M.D., F.R.C.S., late Lieut.-Col., R.A.M.C., etc. Pp. xx., 182. London: H. K. Lewis & Co. 1919. Price 9s. net.

The author served three years in Egypt with the R.A.M.C. as Consulting Aurist and Oculist, and President of a Standing Medical Board, and previously with the Australian Forces, as well as taking an important part in the administration of the Y.M.C.A. and Red Cross.

He discusses various reforms which were carried out in Egypt, which resulted in the saving to the service, then sorely in want of men, of a huge number of perfectly efficient soldiers who were suffering from chronic suppurative otitis, limited vision, or certain orthopædic defects, such as some forms of flat foot without eversion and who would have been lost under the old regulations. He had thousands of the otitis cases treated by mopping out the ear and dropping in daily equal parts of spirit and carbolic lotion (1–15). Hardly any of them developed a general infection in three years. He points out that with reasonable care in selection and treatment the vast majority of these patients do perfectly well. Great fault is found with the earlier medical boards and their waste of good material. One third of the B Class men who arrived in Egypt were at once raised to A category. Ophthalmia, so rife in Egypt, was kept so well under control that in four years only one British soldier lost an eye from it, but when pellagra was present, as in the case of Turkish prisoners and Armenian refugees, it was most disastrous. At one Armenian camp the pellagra was wiped out by raising the calories in the diet. There were very few cases of trachoma, and these nearly all came from Australia. In fact, it was not contracted in Egypt by any British troops. He goes so far as to suggest that the foolishly high standards in unessential things of the English boards were responsible for the shortage of men in France in March, 1918, and the resulting great defeat before Cambrai.

In previous writings he has discussed the management of venereal disease, but here he adds some details of the work done at Port Said, both by prophylaxis and moral means.

There are useful suggestions, too, as to the functions of Red Cross Societies, especially that they should not form or administer hospitals, but confine themselves to providing inquiry bureaus, extra comforts and personal care of the sick, convalescent outings and on on. The thorny question, however, crops up whether they should not in war time cease to be voluntary and amateur bodies, but rather become a part of the R.A.M.C. We seem landed in the old discussion on the comparative merits of voluntary and state hospitals.

As to the organisation of the R.A.M.C., the writer is anxious that it should form in peace a great institution for research and preventive medicine which would attract an able class of men. Promotion both in peace and war should depend on scientific and clinical achievements, as well as on administrative work. It should be possible for a man to rise to the highest rank as a clinician or scientist. At present a great defect is that holders of the highest ranks often cease to be scientific medical men and become merely administrators, out of touch with the progress of their art. The head of a large district should be set free for frequent travelling over it by the appointment of an assistant. Complaint is made, too, of the failure to train new officers, and of the frequent failure to send everywhere with the sick man definite clinical information. An ingenious scheme for promotion is suggested, which he thinks would be attractive and get over many present difficulties.

Some of his proposals seem well worthy of adoption or consideration as meeting recognised defects, but it is fair to add some of the evils have been already removed.

The Hearts of Man. By R. M. WILSON, M.B. Pp. xx., 182. Oxford Medical Publications. 1918. 6s. net.—The writer has made observations on the normal living subject, and sets out to prove a physiological theory. He commences by demonstrating that in "starting" from surprise, or at the beginning of all effort, the abdominal muscles contract in such a way as to drive as much blood as possible derived from the liver and ductless glands through the muscles and brain. Not only the heart, but also the pulmonary, abdominal and other vascular systems have a propulsive power of their own, and these "peripheral sphincters" beat synchronously with the heart. Thus there are five "hearts"—the right auricle-ventricle, the left auricle-ventricle, and the arteriole-capillary systems of the lungs, abdominal viscera and skin. The five "hearts" are joined up by larger vessels, and in these vessels peristalsis occurs, as evidenced by the anacrotic and dicrotic waves of the pulse tracing. The "hearts" are activated by adrenalin, and inhibited by the vagus or "dilator sympathetic"; the great vessels are inhibited by adrenalin, and activated by the vagus or "dilator sympathetic." The theory is adversely criticised in part by Sir James Mackenzie and Professor Bayliss, and it can scarcely be accepted as a whole. For instance, rabbit's aorta is constricted by adrenalin, and is often used as an adrenalinoscope in virtue of this fact; it is not inhibited as suggested in the book before us. The study is, however, worth consideration by those interested in the physics of the circulation.

The Library of the Bristol Medico-Chirurgical Society.

October 31st, 1919.

The following donations have been received since the publication of the list in the Spring Number, 1919.

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NINETY-EIGHTH LIST OF BOOKS.

Aitken, W.	*Science and Practice of Medicine.* 2 vols. (5) 6th Ed.		1872
Allen, R. W.	*Practical Vaccine Treatment*		1919
Althaus, J.	*On Epilepsy, Hysteria and Ataxy* .. .. (5)		1866
Anderson, M'C. ..	*Parasitic Affections of the Skin* (5) 2nd Ed.		1868
Archbold, [—] ..	*Lunacy* (Ed. by G. S. Lushington) (2) 4th Ed.		1895
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MEETINGS OF SOCIETIES.

Bristol Medico-Chirurgical Society.

Annual Meeting, October 8th, 1919.

AFTER a vote of thanks to the retiring President, Mr. R. G. Poole Lansdown, had been passed, Dr. I. Walker Hall took the chair and gave an introductory address (*see* p. 105). Later a cordial vote of thanks was given to Dr. Walker Hall for his able and interesting address.

The Secretary, Mr. A. J. Wright, and the Editorial Secretary, Dr. J. M. Fortescue-Brickdale, read their Annual Reports, Dr. G. Parker read the Library Report in the absence of the Hon. Librarian, Mr. C. K. Rudge, which was as follows :—

The Library of the Bristol Medico-Chirurgical Society now contains 13,279 bound volumes. During the year 175 volumes have been added—of this number 77 were received through the *Journal*.

Owing to the excessive cost, it has not been possible to bind as many journals as formerly, and there are now some 220 unbound volumes.

During the year 53 duplicate books were disposed of, and readers have borrowed 342 volumes.

The Library is in regular receipt of 88 periodicals. An effort to replace the periodicals lost owing to the war was made in May, and members were asked to be responsible for certain periodicals.

The Bristol Medical Library, to which members of the Society have access, now contains 24,209 volumes, and is in receipt of 147 current periodicals.

The strength of the various libraries is as follows :—

BOOKS.

Medico-Chirurgical Society	13,279
University Medical Library	9,211
Other sources	1,719
	24,209

CURRENT PERIODICALS.

Medico-Chirurgical Society	88
University Medical Library	59
	147

The following are the officers of the Society for the Session 1919–1920 : President—I. Walker Hall, M.D.Vict. President-Elect—L. E. V. Every-Clayton, M.D. Lond. Committee (*ex officio*)—R. G. P. Lansdown, M.D. Durh. (retiring President), P. Watson Williams, M.D. Lond. (Editor of *Journal*) C. K. Rudge, M.R.C.S. (Hon. Librarian) ; J. M. Fortescue-Brickdale, M.A., M.D. Oxon. (Editorial Secretary) ; A. J. Wright, M.B. Lond. (Hon. Secretary). (*Elected*)—R. Shingleton Smith, M.D. Lond. ; G. Parker, M.D. Cantab. ; J. Lacy Firth, M.S. Lond. ; J. O. Symes, M.D. Lond. ; T. Carwardine, M.S. Lond. ; D. C. Rayner, F.R.C.S. ; John Wallace, M.B., C.M. Edin. ; J. A. Nixon, C.M.G., M.D. Cantab. Library Committee—C. K. Rudge, M.R.C.S. ; W. A. Smith, M.D. ; George Parker, M.D.

RECEIPT AND EXPENDITURE ACCOUNT OF THE BRISTOL MEDICO-CHIRURGICAL SOCIETY, SESSION 1918–19.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance from 1918 ..	178	10	10	University of Bristol (Rent)	20	0	0
Members' Subscriptions	124	19	0	Librarian, Honorarium	15	16	0
Interest on Deposit ..	3	6	9	Library Grant	25	0	0
				Journal Grant	38	15	0
				Audit Fee	2	2	0
				Subscriptions refunded..	8	8	0
				Miscellaneous Expenses	9	13	5
				Balance in Bank	187	2	2
	£306	16	7		£306	16	7

Audited and found correct,

CURTIS, JENKINS & CO.,
Chartered Accountants.

3rd October, 1919.

November 12th, 1919.

I. WALKER HALL, M.D., President, in the Chair.

Dr. E. C. WILLIAMS showed the following cases :—

1. **Pseudo-Hypertrophic Muscular Atrophy.**
2. **Cerebral Diplegia.**
3. **Ataxia.**

Mr. HEY GROVES showed cases of and read a paper on
"Internal Derangement of the Knee Joint."

Dr. SCOTT WILLIAMSON read a paper on
"The Clinical Value of Blood and Urine Analysis."

Proposed change of Rule 7.

The PRESIDENT read the proposition of the Committee that Rule 7 shall be altered to read as follows :—

The Subscription of the Society shall be One and a Half Guineas per annum, payable in advance ; this sum shall include the subscription to the *Journal* and the use of the Library, with the privileges appertaining to the circulation of Library Books.

The following Notice to Members had been previously circulated :—

The Committee has had under consideration the ways and means of maintaining the objects of the Society during the period of increased cost of materials, etc.

Nelson A. Miles

The Society has hitherto published a quarterly journal, consisting of approximately 96 pages.

In 1914 each number was produced for £36.

In 1919 each issue will cost £62.

In 1914 the distribution cost £3 per number.

In 1919 the distribution will cost £6 per number.

The Committee recommends the Society to provide for the continuance of the *Journal*, to maintain thereby the value of the Society to those members who are not able to attend the meetings, and to continue the support the Society has given to Bristol as a teaching and scientific centre.

The Committee therefore proposes the following resolutions :

" That the Subscription to the Bristol Medico-Chirurgical Society be increased to One and a Half Guineas per annum, and that the Subscription to the *Journal* be raised to 10/6 per annum."

" That owing to the special circumstances, members shall be invited to pay the increased subscription from October, 1919."

These resolutions were agreed to unanimously.

J. LACY FIRTH.
A. J. WRIGHT, *Hon. Sec.*

Obituary.

NELSON CONGREVE DOBSON, F.R.C.S., CH.M. (Bris.). 1845–1919.

MR. DOBSON, whose life has been that of an invalid since the time when he resigned his office as Surgeon to the Bristol General Hospital in 1893, and afterwards dropped gradually out of active practice, was born at Holbeach, in Lincolnshire, in 1845.

His school life was passed in the Grammar School of that place, and at a private school in Cambridgeshire, but his progress was much retarded by continued ill-health. However, at 16 he was apprenticed (by the now extinct method) to a Dr. Harper of the town, and lived with him for three years. " He was an excellent surgeon for his time, and I learned many things of him for which I was always thankful." He then entered St. Thomas's Hospital Medical School, starting his

student's career " with a fair knowledge of the bones and odds and ends of medical matters in general." Having gained many prizes as a successful student, he passed the M.R.C.S. and L.S.A. in 1867. He became House Surgeon at St. Thomas's, and was elected as Assistant House Surgeon of the Bristol General Hospital in 1867 and House Surgeon in 1868, but resigned the resident appointment after three years, when he commenced practice in Clifton in 1871, and was at once appointed Surgeon to the Bristol Royal Hospital for Sick Children and Women. This office he resigned within the year, on his election to that of Surgeon to the Bristol General Hospital, which he held with distinction until 1893, when he resigned in consequence of failing health, and became Consulting Surgeon to the Hospital.

One of his Hospital colleagues (Mr. C. A. Morton) writes as follows :—

" I can very vividly recall Mr. Dobson's activities as Surgeon to the General Hospital at the time when the most unfortunate affection of his sight began to interfere with his surgical work. He was so keenly interested in surgery, and in the welfare of his hospital patients, was so skilful as an operator, and so capable as a diagnostician, that his failing sight was a great calamity, not only to himself, but also to the Institution which he had so faithfully served for many years. We well remember the first indication of his imperfect vision. It was during the performance of an operation for varicose veins, when he asked his assistant to do more than is usually expected of an assistant, because, as he said, he could not see very clearly. But he always, in public at any rate, seemed to retain his cheerfulness of mind, though he knew what this failure of vision must lead to, and it was always a pleasure to be associated with him in his surgical work.

" Mr. Dobson was the first surgeon to suggest that a perforated gastric ulcer might be sewn up, though he had not the opportunity of putting his suggestion into practice. Sir Alfred Pearce Gould, in his address on this subject at the Bristol Annual Meeting of the British Medical Association, in 1894, soon after Mr. Dobson's retirement, referred to this, and also to the fact that Mr. Dobson's failing sight prevented his occupying the Presidential Chair of the Section of Surgery, which Sir Alfred then occupied.

" I well remember a discussion on Wheelhouse's operation for stricture, at a meeting of the Bristol Medico-Chirurgical Society at the time Mr. Dobson was in practice as a surgeon, and how he impressed us with the fact that this operation, which a surgeon had just very highly recommended, was not always, as he said, the ' very rosy operation ' which had been indicated, and he graphically described some of its difficulties and pitfalls.

" In 1889 Mr. Dobson gave the Presidential Address to the Bristol Medico-Chirurgical Society, in the formation of which he had been actively engaged, and with regard to its successful work he expressed the keenest satisfaction. In this address he made an eloquent appeal for early operation in suitable cases of cancer, but pointed out the inadvisability in many advanced cases. Like the surgeon of the present day, he says, ' I have constantly to deplore too late cases.'

" It is interesting to read in his address that he looked forward to the time when cancer should be as much under the control of medicine as syphilis ; but, alas ! though the treatment of syphilis by drugs has advanced considerably, yet there is no reason to think this is likely.

" The operations for cancer, when he was in practice, were by no means so extensive as to-day, and the surgeon did not even as a routine practice clear out the axilla when operating for cancer of the breast ; yet Mr. Dobson tells us of a case in which he removed a cancerous breast without doing so, with the result that the patient was free from disease fifteen years later, although the malignant character of the growth seems to be without doubt, as it did recur soon after the operation in the scar, but the recurrent growth was removed. At this period of surgery (1889) Mr. Dobson and many other surgeons were deterred from operating in gastro-intestinal cancer by the very high mortality, and the rapid recurrence which seemed at that time to be frequent, and he did not consider operation advisable in such cases."

Meanwhile he had done useful service in the Bristol Medical School, having been Demonstrator and afterwards Lecturer on Anatomy and later on Surgery. Subsequently he became Professor of Surgery in the Bristol University College, and finally Emeritus Professor. Mr. Dobson passed the Fellowship Examination of the Royal College of Surgeons of England in 1870, and the honorary distinction Ch.M. of the University of Bristol was conferred on him in 1912. He did good work at the Hospital and Medical School, where as a fluent and ready speaker his presence was much appreciated by both his colleagues and the students who fell to his care. During his early years he took a considerable share in the negotiations and lengthened disputations which culminated in the foundation of the University College and the affiliation thereto of the old Bristol Medical School ; this temporary affiliation scheme was followed by entire incorporation with the new college many years later, and afterwards with the newly-formed University of Bristol.

Mr. Dobson took quite a leading part in the establishment of the Bristol Medico-Chirurgical Society in 1874, he was a frequent contributor to the work of the meetings, and was duly appointed President for the year 1889–90. Many will remember

his interesting Presidential Address on "Some Surgical Aspects of Carcinoma," where he concludes as follows: "It appears to me that in superficial cancer we have, up to the present, no remedy so reliable as early and free removal; and I end what I have to say by a plea for early and exact diagnosis and early reference to the surgeon."

He was also President of the Bath and Bristol Branch of the British Medical Association, and at the meeting of the Association in Bristol in 1894 was Vice-President of the Surgical Section.

For a long series of years Mr. Dobson took a warm interest in the Bristol Nurses' Institution and Private Nursing Home. He continued as Chairman of the Sub-Committee and Committee until within about a year of his death.

He was for many years a member of the Council of the University College of Bristol, and in 1895 he distributed the prizes and delivered an address to the students of the Medical Faculty.

Formerly he was a member and afterwards President of the Clifton Shakespeare Society, and this was a great comfort to him in his later invalided years, for he remembered much of what he had read, and was always ready with an apt quotation in the words of the great author.

In his active days he was fond of fishing, and enjoyed many a week-end testing the fishing resorts of the district; but the engagements of a large practice gave him little time for such amusements, and later the failure of his sight gave him little desire for it. The same remark applies to the pastimes of whist and bridge, the latter of which was a great solace to him for many years when he was not able to read, and whilst he still had some little vision with the help of a glass at short range.

Since the year 1898, over twenty years, his rôle has been that of a patient sufferer from maladies which he knew must be fatal in the long run; but his mental condition never failed till within a few days of his death, and he was always keenly interested in medical matters, as well as during the last few years in the daily events of the Great War. Having three sons in the Army and one in the Navy, the varying fortunes of the country were the subject of the keenest inquiry daily, and he felt most acutely the loss of two of his sons, one a brilliant officer who was killed in action at Loos, the other in Mesopotamia. The surviving son in the Army did much good work in India, Egypt, Arabia, and elsewhere. The naval son greatly distinguished himself recently in the attack on Kronstadt in the Baltic, and cheered the heart of the invalid at home by receiving the decoration of V.C., in addition to his previous D.S.O.

During the last year of his life, feeling his helplessness, he sometimes referred to his fate of blind inactivity.

> " We, like sentries, are condemned to stand
> In starless night, and wait the appointed hour."—DRYDEN.

When he contemplated—

> " That bourne from whence no traveller returns,"

a quotation from Spenser's *Faerie Queene* pleased him—

> " Our times are fix'd and all our days are number'd
> How long, how short, we know not. This we know,
> Duty requires we calmly wait the summons,
> Nor dare to stir till Heav'n shall give permission."

He often quoted from Hamlet's soliloquy—

> " To sleep, perchance to dream : ay, there 's the rub,
> For in that sleep of death what dreams may come
> When we have shuffled off this mortal coil."—Act iii., Scene 1.

Like Edwin Arnold, he appeared to await death with almost eager curiosity, as if anxious to find out the realities of the other side, for he would not accept the dreams of the spirit philosophers, whose so-called revelations he classed with Hamlet's " Words, words, words " (Act ii., Scene 1), and believed with Pope that—

> " Words are like leaves ; and where they most abound
> Much fruit of sense beneath is rarely found."

Dobson was not a prolific writer, but the following list would have been much extended if his sight had not failed him in comparatively early life.

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HUGH CHAMPNEYS THURSTON, C.B., C.M.G.

It is with much regret we have to record the death of Colonel Hugh Champneys Thurston, C.B., C.M.G., Army Medical Service, who died after a very short illness at Torquay on August 17th, 1919, and only a few weeks after he had retired from his arduous duties in the Field.

Hugh Thurston was born on March 14th, 1862. He was the son of the late O. E. Thurston of Kington, near Thornbury, and joined the old Bristol Medical School in the late seventies, where he took a prominent position in the prize lists as well as in the football field. He took the L.R.C.P. Lond. and M.R.C.S. Eng. in 1884, and in the same year he came into residence at the Infirmary as Assistant Resident Officer and Pathologist, showing himself at once to be a practical and energetic man. During the years 1884 and 1885 he paid special attention to Pathology, and the Infirmary Museum still contains many excellent specimens collected and mounted by him.

He was a great favourite in the wards, and was much missed in Bristol when he joined the R.A.M.C. in 1887. He very soon saw active service in Burma with the Wuntho Expedition under Sir Garnet Wolseley in 1891, for which he was awarded the medal and clasp.

In 1896 he married Susie, daughter of the late Charles Steele, M.D., F.R.C.S., of Clifton.

Thurston was promoted Major in 1899, and served in South Africa during the whole of the war, 1899–1902. He was present at the Relief of Kimberley, and took part in the operations at Paardeberg, also in the following actions: Poplar Grove, Zand River, near Johannesburg, Pretoria and Diamond Hill, Reit Vlei and Belfast, and at Colesberg. For these numerous services he was mentioned in despatches, obtained the Queen's Medal with five clasps, and the King's Medal with two clasps, and honoured with the C.M.G.

Hugh Thurston was Deputy Assistant Director-General at the War Office from 1904 to 1908.

In 1908 he presided at the Bristol Medical Dinner, when a very large company attended to greet him.

He was promoted Lieutenant-Colonel in 1911 and Colonel (A.M.S.) in 1915.

He served with much distinction throughout the Great War as A.D.M.S., and acted for a considerable period in 1917 as D.D.M.S. at the important Medical Base at Havre.

During the war he was frequently mentioned in despatches and was honoured with the C.B.

The writer of this notice met him several times in South Africa and in France, when yarns of the B.R.I. and the old School were told. As a junior officer he was always loyal to his Alma Mater, and as a senior officer was always ready to give a cordial welcome to those who hailed from the West Country.

Colonel Thurston leaves a widow, one son and one daughter to lament his loss. He will long be remembered by all who knew him in the years now gone, as a kindly gentleman, an able administrator, and a sound medical man.

SIR WILLIAM OSLER, BART., M.D., F.R.S., F.R.C.P.

As we go to press we hear with deepest regret the news of Osler's death, at the age of 70. His life was a remarkable instance of what one man may achieve. His three professorships at McGill, Johns Hopkins and Oxford are proof enough that Osler was cast in no ordinary mould. His text-book found a wider public than any medical work since Galen. The wisdom of his public utterances won universal acknowledgment. Yet what we shall chiefly miss him for is his warm-hearted friendship. In all history there has been no one who was the personal friend of so many of his fellows. Osler's greatest gift was his capacity for interesting himself in the doings and interests of others. Some are accounted leaders because they attract a host of infatuated devotees; it was otherwise with Osler, he was not made of the stuff that absorbs adulation. His greatness lay in what he gave so freely: his encouragement, his sympathetic understanding and his friendship. We do not mean to belittle his own contributions to medicine. We hold in higher esteem the unique position he occupied as a midwife of true learning.

Local Medical Notes.

EXAMINATION SUCCESSES.

Students of the University have recently passed the following examinations:—

UNIVERSITY OF BRISTOL.—*M.B., Ch.B., First Examination, Part I.:* A. T. Binnie, S. H. Blacker, A. P. Bodman, N. Joan Bown, E. G. Bradbeer, E. R. Clutterbuck, Mary F. Dalton, E. Davis, B. Veronica F. Dawkins, H. Mary Dixon, R. H. Dummett, G. R. Dunn, F. R. Edbrooke, E. B. Eedle, N. J.

England, P. G. Evans, H. M. Golding, J. L. Griffin, A. G. Heron, J. A. James, F. G. Jenkins, Doris E. Joscelyne, P. C. Joscelyne, A. H. Marshall, J. R. Nicholson-Lailey, K. F. Platt, A. S. Prowse, H. Taylor, R. E. Whitby. *M.B., Ch.B., Part II.:* M. Critchley, J. R. Duerden, Phyllis T. Siepmann. *L.D.S., First Examination:* N. H. Bodenham, R. H. Davies, H. A. Jones. *L.D.S., Third Examination:* E. J. Tucker.

UNIVERSITY OF LONDON.—*M.B., B.S., Third Examination:* G. M. Jackson, R. F. White. *Group II.:* J. A. Birrell.

F.R.C.S. ENG.—*Primary:* H. J. D. Smythe. *Final:* A. W. Adams, A. G. T. Fisher.

M.R.C.S., L.R.C.P.—B. A. Astley-Weston, G. T. Mody, G. A. Pennant, T. H. A. Pinniger, B. R. Reynolds, W. Worger, A. E. Young.

ROYAL COLLEGE OF PHYSICIANS, LONDON.—Major F. P. Mackie, I.M.S., and H. Devine, M.D. Lond., elected Fellows.

CONJOINT.—*Anatomy and Physiology:* Mary A. E. Somers. *Medicine:* F. S. Hunter, B. R. Reynolds. *Midwifery:* F. V. Jacques.

L.D.S., R.C.S. ENG.—L. H. Bradbeer, L. B. James.

L.S.A.—J. F. E. Burns, D. G. Cossham. *Forensic Medicine:* J. H. Eglinton.

POSTGRADUATE STUDY.—The experience of the past year has shown that whilst a good attendance can be attained at postgraduate demonstrations during the months of May, June and July, it is difficult for busy practitioners to find the time during the autumn and early winter. It is proposed therefore for the 1920 session to give a course of about eight demonstrations during the summer months. The subjects will be announced later.

In the meantime if sufficient names are forwarded to the Director an effort will be made to extend the opportunities for postgraduate study in fresh branches of medical work, including tuberculosis, child welfare, venereal diseases and school inspection work. Medical men desirous of taking up postgraduate work during the winter months are reminded that clinical assistantships are open in all departments of medical and surgical work, and in the special departments. Where regular attendance is not possible, a man may attend any or every branch of hospital practice for a number of days equivalent to one month. The Director of Postgraduate Studies, Pathological Department, University of Bristol, will be pleased to answer any inquiries.

ILLUSTRATIONS.—*Contributors are asked to note that sketches for reproduction as line blocks should be drawn in black Indian ink on white paper, and of the actual size (quarter, half, or full page) they are to be reproduced.*

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